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ALLsocket skirting

Discreet, multi-voltage slot and card power outlet system with built in standby eliminator

Unchain your equipment,

Constrain your consumption

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1.0 Introduction

1.0.1 The Fight For Power

Britain's vast stocks of Edwardian and Victorian homes were built when most households didn't even have a radio. Then came inventions such as fridges, washing machines, televisions, satellite decoders, computers (and peripherals), mobile phones, ipods…and so on.

Over the last 30 years, Information Communication and Entertainment products have revolutionised our homes, yet even newly built homes don't seem to be up to the challenge of providing the electrical sockets to cater for our addiction to technology.

1.0.2 The Effects?

An unsightly and DANGEROUS mass of cables plugged into multi-socket extension boards, which is a major tripping hazard, and also risks overloading and overheating, in turn causing a fire. If that's not bad enough, with traditional 'chased in' electrical ring or radial mains, by the time a fire is noticed it has often been burning behind the scenes for some time already.

The advice from bodies such as the Institute of Electrical Engineers, Electrical Contractors Association, and the National Home Builders Council is to make sure there are enough sockets fitted in your home satisfy the need. The guidelines recommend thirty eight for a three bed home1.

Even so, a survey carried out by the Copper Development Association in 20002 showed that after two years of building, 67% of the owners of 3 bed houses felt they didn't have sufficient sockets to cope with the demands of modern technology.

1 Adequate Provision Of Electrical Socket Outlets in the Home ECA, Aug 2006
2 Electrical Convenience in New Build Homes Survey, CDA, June 2000

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Standby to Attention

The increase in the number of gadgets and ICE equipment also brings other issues beside where to plug it in; standby wastage.

Figures from the Energy Saving Trust suggest the average household wastes £37 each year by leaving on average 12 gadgets left on standby or charging at any one time1. This equates to more than £740m of electricity wasted, or in terms of CO2 emissions, equivalent to 1.4 million long-haul flights.

Despite efforts from bodies such as The Energy Saving Trust, The International Energy Agency, the Market Transformation Programme insists that it would not be practical to introduce legislation in the UK to remove the standby function as it would entail higher prices for unique UK models.

Manufacturers claim it is a purely consumer-driven and not a technical issue, with the exception of set-top boxes for example, which need to have power all the time to download and update their electronic programming guides. According to the Market Transformation Programme, 'manufacturers include sleep modes on their products because it is what their customers want'.

1 The Ampere Strikes Back, The Energy Saving Trust, June 2007

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2.0 Mission Statement

It's clear that we are not going to end our love affair with technology and gadgets anytime soon. But addressing the problem of insufficient electical outlets in todays homes brings about an ethical argument; our increased consumption and waste of dwindling resources, and in turn, our carbon footprint.

Changing attitudes takes a very long time, and is nigh impossible without some apparent and immediate benefit to dangle like a carrot in front our noses. So the ALLSocket sets out to accomplish this, by providing an aesthetically sound solution, with an ethically sound conscience.

The ALLSocket power distribution system objectives are:

To equip today's homes with sufficient access to the electrical mains and eradicate the use of unsightly and dangerous extensions boards.

To eradicate the need for transformers (and therefore waste from the inefficiency) required to power modern day 'gadgets' which run on low voltage.

To further reduce waste caused by standby modes on most modern AV equipement.

To provide an alternative to 'chased-in' mains systems, which is safer and easier to maintain.

To be able to work seamlessly with sustainable ecological methods such as photo-voltaic panels, wind turbines and other low voltage power generators.

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3.0 Brief - Residential Power Distibution Track

3.0.1 Summary

A new way to deliver electricity by way of a track system integrated into the skirting board (or splash-back for kitchens) whereby appliances can be plugged in anywhere along the track.

3.0.2 Background

The domestic system for power distribution has changed minimally during the 100 years it's been in use. Yet our use of electricity and dependency on more and more electrical gadgets has changed immensely. Standard fixed-location power outlets pock-mark even the most modern designed interiors, and the problem with more dated buildings is that there are never enough outlets, and so the need for extension gangs, and restrictions over location of our appliances.

3.0.3 Possible features and accessories:

- Adaptors to initially connect existing worldwide variations of electrical plugs
- A master off switch to cut power to all non-essential items plugged in to the track - possibly achieved by radio frequency and a switch by exits or bedside
- Dedicated adapter units for the delivery of variable DC power, with hundreds of varieties of terminations to fit existing products, plus ongoing manufacture of emerging ones
- Timers
- Standby eliminator – either switch off by remote control, usb or automatic detection of load dropping
- Compatibility with low voltage supplies and therefore 'green' power such as Photovoltaic Panels. (PV's), wind turbines and hydropower.

3.0.4 Strengths:

- No other product competing
- Eliminates the need for 3 pin power outlets and extension gangs
- Liberates user from limitations of proximity to wall sockets
- Form belies function
- Easy to install

- Eco friendly

3.0.5 Weaknesses:

- Needs to overcome extremely established existing system
- Needs to adhere to stringent safety and building regulations

3.0.6 Opportunities:

- New builds, housing associations, regeneration/renovation projects, interior designers.

3.0.7 Threats/competition:

- Eubiq power track (came to market in late 2006) power distribution in stand alone tracks.
- Standby Saver, SavaSocket, PowerSafer, Standby Buster – products which cut consumption.
- UPVC Skirting trunking.

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4.0 Research

4.1 Competition

There are a plethora of solutions on the market which address one or maybe even two of the objectives ALLSocket sets out to achieve. Many of them are more suited to industrial or commercial premises, adopting materials such as aluminium or PVC and therefore it could be argued the aesthetics are not really suited to a stylish interior. The goal for developing ALLSocket is to concentrate on what advantages each of these offer over each other, and attempt to bring them all together producing the ultimate solution.

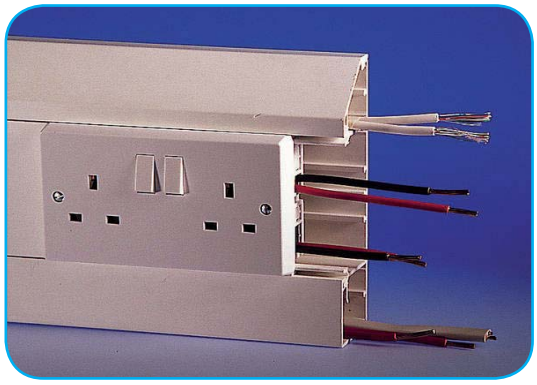
4.1.1 Trunking and Cable Management Solutions

These type of solutions offer an alternative to chasing in cables as the cables are run in the skiritng or dado trunking. They also offer datacomms trunking and outlets for cat5 or 6 ethernet cabling for controlling many applications by pc.

Prestige 3D Skirting from MK Electric

Pros:

- Kit form
- Ease of installation
- Datacomms outlets
- Ease of maintenance
- Accepts standard 3 pin sockets and therefore no re-wiring of plug necessary



Starline PVC Dado and Trunking

Cons:

- Lacking style
- Requires backboxes and sockets so still limited to the number of socktes installed and their location
- Expensive with the cheapest Starline system around £50 per 3m assembly + 2 double socket and internal + external corner caps

Powerlink

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4.1.2 Skirting Profiles

Another solution widely available in many forms to not having to chase in cables is skirting profiles. Usually made from uPVC although there are some extruded from aluminium. These are more aesthetically pleasing, and obviously less chunky as they do not serve as mains distribution products.

Dural's Construct skirting

Pros

- Slim and better looking
- Low price
- Easy installation
- Low/easy maintenance
- Keeps cable tidy and out of sight

Cons

- No mains points, only trunking

Icontactech Timber Mouldings

SL Slimline Trunking

http://www.icontacttech.com/Main.aspx?Page=Home

- *Energy Saving Products*

More recent products on the market are the ones designed to cut consumption by automatically switching off equipment that has gone into standby mode. As the Energy Saving Trust suggests, the average home could save around £37 each year using these products, so they pay for themselves generally within 6 months. Their popularity has increased due to exposure on programs like Dragons Den.

Saves Money, Saves Energy
Standby Saver
standby saver
Works with your existing remote control
Works with both Infra red and USB
Pay back in months
Cuts 100% of standby power
Easy installation

Standby-Saver by Ecotek

Pros

- Cheap and simple solution to energy waste
- Can be used anywhere
- No installation required

Cons

- Just more extensions
- Bulky
- Unsightly tangle of cables still a problem
- Still require sufficient number of accessible sockets
- Overload risk still present

Intelliplug by OneClick

Bye Bye Standby

http://www.standby-saver.com/
http://www.oneclickpower.com/
http://www.byebyestandby.co.uk/

4.1.3 Power Tracks

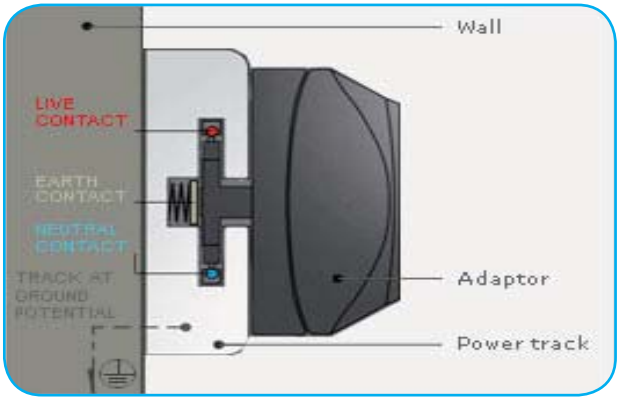
The closest thingthe the ALLSocket concept which came onto the market in late 2006 is the Eubiq powertrack system. It solves the problem of being able to plug in any number of their appliances anywhere along the track. It's also one of the very few systems which has redesigned the actual plug, making it safer and less bulky, and also improved the aesthetics. The Eubiq is intended for smaller strips rather than fitting as a whole skirting board around the room, and can accomodate a multitude of plugs with it's various adaptors. However, it's very pricey.

Pros

- Nice Aesthetics
- Safe
- Various configurations ie dado, skirting, recess or surface mounted
- No restrictions to the number or the location of plugs
- Ease of installation
- Redesign and improvement on 3-pin plugs
- Datacomms (Cat 5/6) trunking and socket housing
- Various purpose adaptors for data and power

Cons

- Does not offer any power saving or 'eco' features
- Not designed for the whole of the room
- Very expensive at over £80 for a 30cm strip



http://www.eubiq.com/

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4.2 Regulations and Compliance

There are many regulations and standards which the ALLSocket system will need to comply with.

A summary of points are taken from guides to these regulations, and the concept has been developed with these points given due consideration. These areas are:

- No live conductors should be bare to the touch
- The need or not for sliding covers over live conductors
- Minimum cross sectional area of the conductors for specific currents
- Minimum cross sectional area of contacts to conductors
- Force of contacts to conductors for mehanical strength and continuous current
- Force and cross sectional area of connectors/couplers for mehanical strength and continuous current
- Fixings of covers over live parts
- Access to connectors for inspection

The British Standards which will apply to the ALLSocket system include (in the main):

- BS 7671:2001 Requirements for electrical installations. IEE Wiring Regulations. Sixteenth edition
- BS 7671:2008 Requirements for electrical installations. IEE Wiring Regulations. Seventeenth edition (1st july 2008
- BS EN 60364. Low-voltage electrical installations
- BS EN IEC 61534-1:2003 Powertrack systems. General requirements
- BS EN 61534-21:2006 Powertrack systems. Particular requirements for powertrack systems intended for wall and ceiling mounting
- Building Regulations Part P Electrical Safety

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5.0 Concept Development

5.1 Skirting Assembly

5.1.1 Note on Installation

It comes in vaying lengths from 1m to 4m, and with mitred ends or flat ends which connects with corner caps and end caps for ease and style choice.

It is intended the ALLSocket will offer the Electrical Engineer many options when designing the installation, for example as single stand-alone 230/240vAC strips in individual rooms for gadgets only, or in a dual power system for houses with their own sustainable power methods ie photovoltaic cells or wind turbines, in which case it can be run as an alternative DC power supply alongside conventional 230/240v AC for a limited number or appliances.

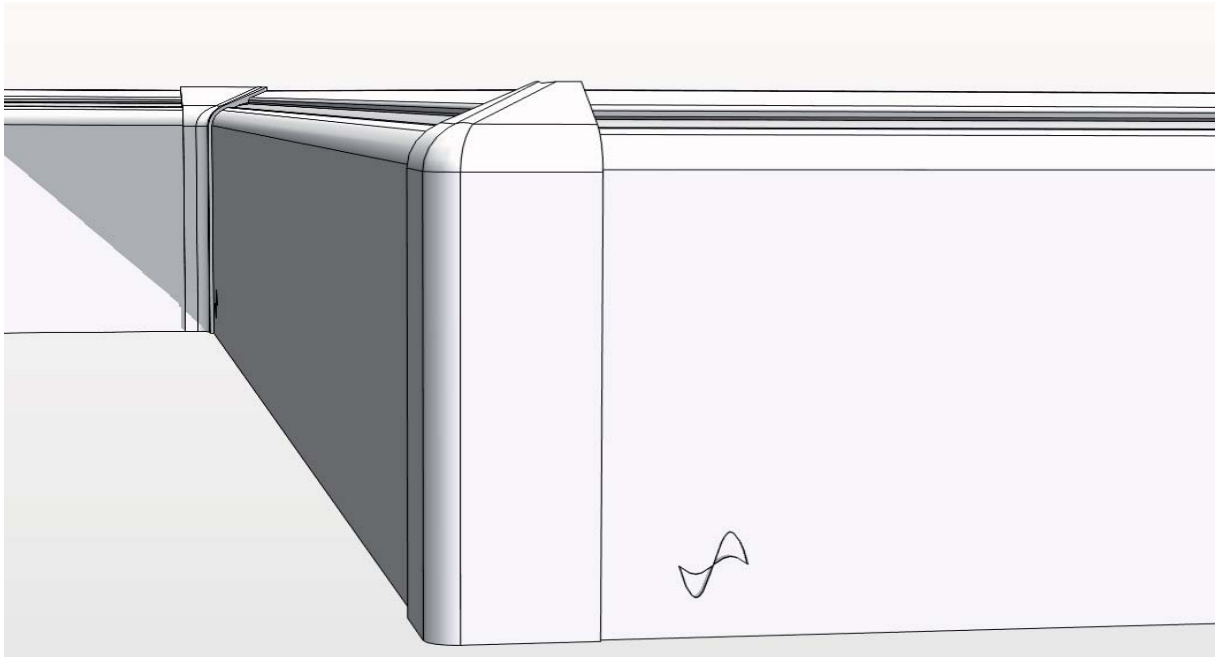
Should the installer decide to fit the ALLSocket system around the entire interior perimiter, it should be configured to each individual room as ring final circuits, and as ALLPlugs are not fused, each ring circuit protected with a Residual Current Device.

5.1.2 Objectives

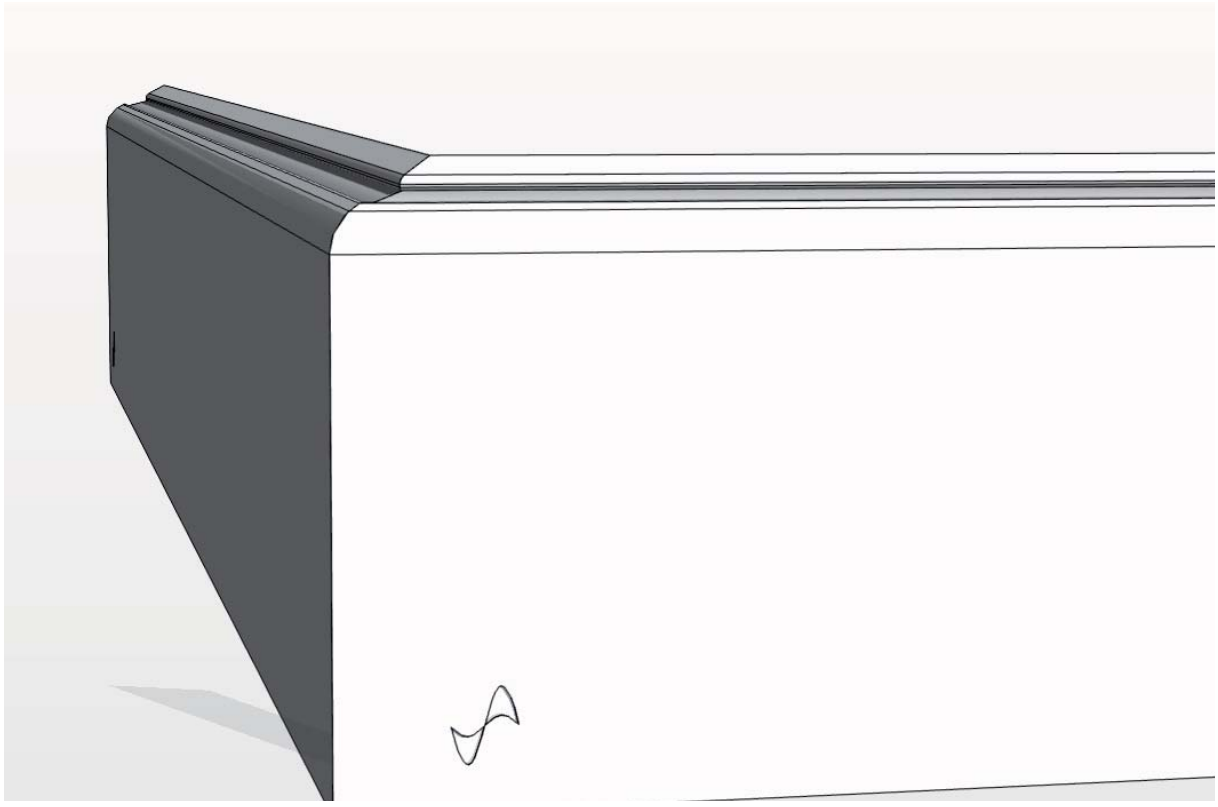
- Slim yet robust
- Aesthetics - non-imposing and as inconspicuous as possible - form belies function
- Ergonomics - capable of multiple configurations to suit
- Safety – prevention of shock from foreign objects being inserted
- Ability to receive plugs at any point (excluding joins and butts)
- No (or few) moving parts
- Economics - simple profile based parts which can be extruded
- Easy to install
- Easy removal of fascias to access cable trunking without exposure to live parts
- Multiple Configurations possible
- Connectivity – strength and robustness of connecting contacts
- Fitting to building interiors of various specifications, ie non-square corners, bay windows etc
- Conductors compatible with 240v AC and 12v DC systems (ie pv panels and wind turbines)
- Compliance with BS/EU regulations

5.1.3 Styles

Corner Caps



Mitred



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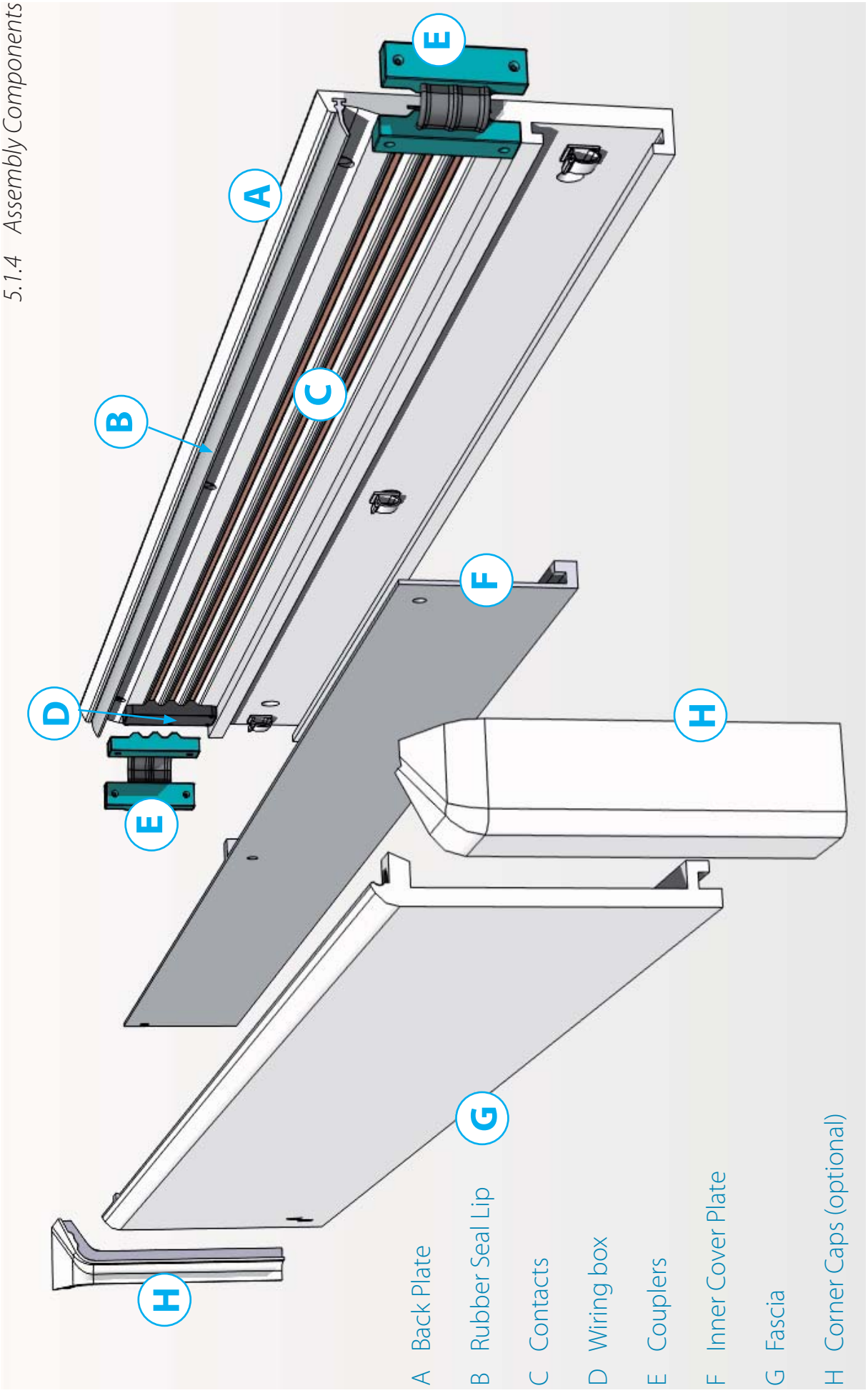
5.1.4 Assembly Components



A Back Plate
B Rubber Seal Lip
C Contacts
D Wiring box
E Couplers
F Inner Cover Plate
G Fascia
H Corner Caps (optional)

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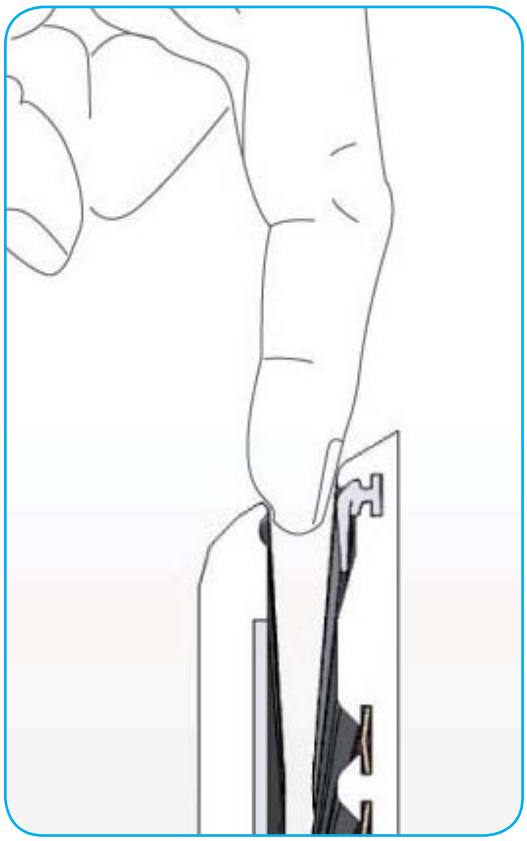
5.1.5 Design Rationale and Iterations

A Back Plate

FUNCTION

The back panel will be the chassis for all the skirting parts, and will be fixed to the wall for all the other parts to fix from it. As such this will need to be the stongest and most complex part.

SLOT WIDTH



Needs to be big enough for the plug and contacts to enter, but small enough to prevent any fingers or foreign objects from entering and touching conductors, either accidentally, or intentionally. Also slim enough to be in keeping with the intended aesthetics.

Refering to the Eubig system, the slot is featured on the front of the system, but as the redesign of the plug is intended to be a 'card and slot' like movement, this is not be possible due to the thickness of the skirting.

A slot gap of 10 mm will be adopted, which will be wide enough to accomodate a sturdy enough plug, yet thin enough to prevent 'little fingers' from entering. In order to protect the open slot from dust and other small objects entering, it will be protected by a rubber seal (component B) which requires a keyway.

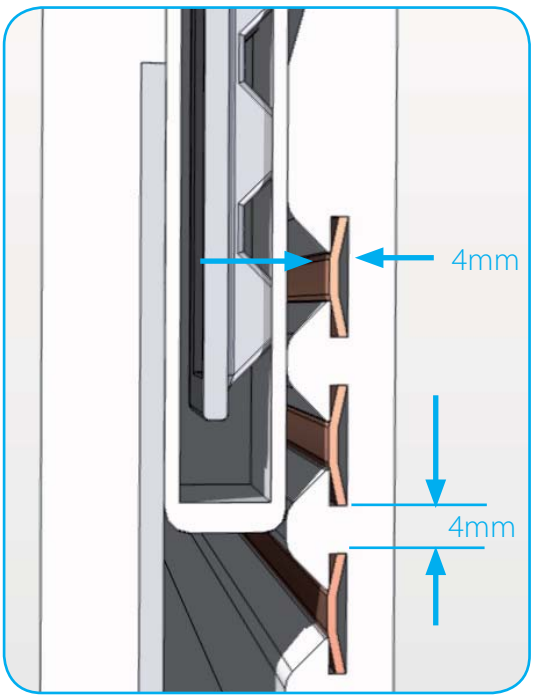
CONDUCTOR LOCATION, ORIENTATION, AND SWEEP DISTANCE

The possiblilty of sprung contacts in the back plate was explored, but this means that slimness is compromised, plus introducing more moving parts which would complicate the intended extrusion. Also perhaps placing one conductor on the front face of the slot, and two or the rear of vice versa, or maybe one on front, one on back face, and one at the bottom of the channel, but the final decision was to have all three on the back face, and the profile of the conductors is designed to offer some spring. It is simpler for the interfacing plug to be designed this way, and also all the conducting parts can remain connected when the fascia is removed for either maintenance or to enable new cable trunking.

The conductors need to be seperated sufficienty to adhere to the wiring regulations, and

the minimum separation required for insulating between the conductors of non-similar polarity is 2mm. With respect to the design iterations of the plug and corresponding contacts, this will be 4mm, so exceeds the regulation requirements.

Contacts must be horizontal for the extrusion key-way, therefore with the intention of the plug slotting in from the top, a way of keeping the plug contacts from sweeping across all non matching polarity conductors is devised. A sweep distance of 4mm is adopted as per IEE Regulations.



PROFILE

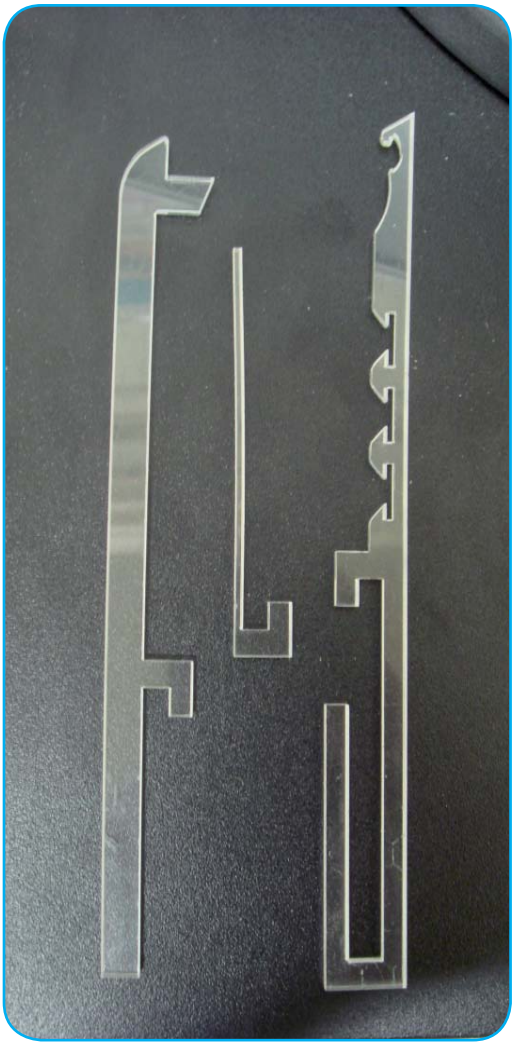
Basic Protection regulations (formerly protection from direct contact) state that no conductors should be exposed whilst live, and that sockets must be protected by a shutter (in the 3 pin type G plugs, the longer earth pin acts to open the cover).

With the conductors of the back panel embedded into a recess in the back wall of the slot and the slot width is designed so that no fingers can enter to touch the live parts, this regulation is satisfied. A shutter similar to the type already in use was considered, but this was ruled out because:

i) The profile design of the recesses mean it's virtually impossible to create a circuit with the conductors without the same inverse profile

ii) Sliding parts would compromise either the strength or the slimness of the part and increases risk of a fault.

iii) To be faithful to objective of being able to slot the plug in at any point along the track, it requires many moving parts, in turn making the part more complex to manufacture as it would no longer be a simple extrusion but instead an assembly which would drive up part costs.



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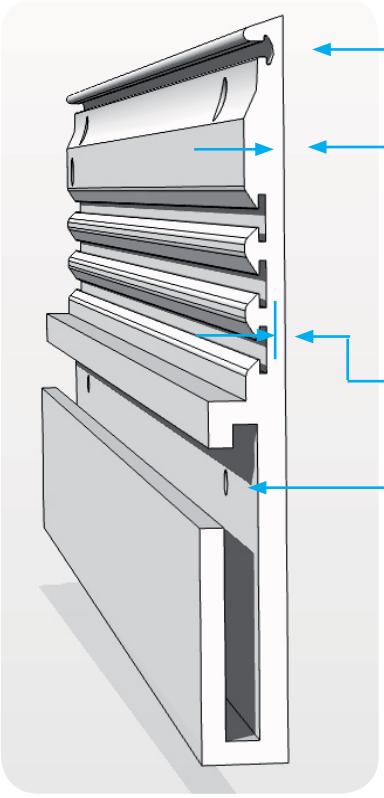
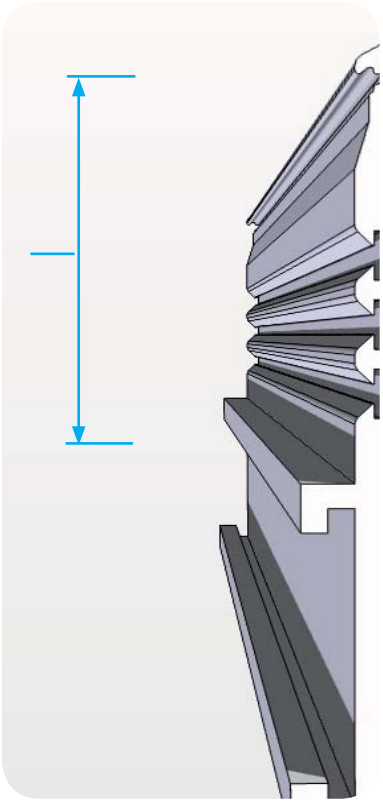
Affter drawing up the chosen profile in CAD, it was laser cut from a piece of 2mm acrylic to get a truer sense of scale and identify the weaker points. From this laser cutting, the profile was refined.

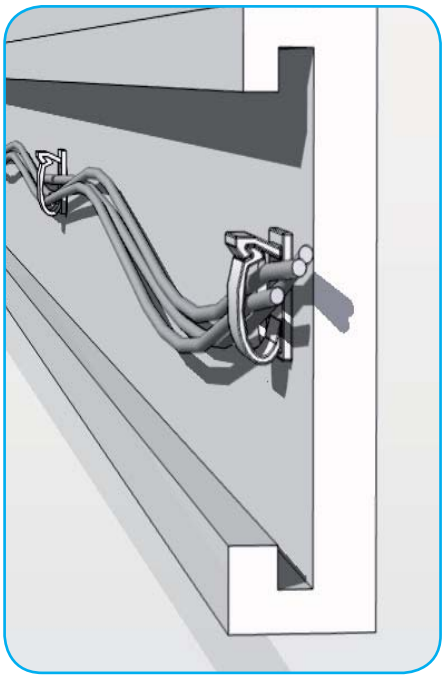


- Strengthen lip keyway (see lip profile page 19)
- Increase the depth of the rear face
- Make the channel deeper (after iterations with the plug casing)
- Deepen conductor re-cesses (page 20)
- Reduce cable trunking retainer and use clips or ties instead.



CABLE TRUNKING

Beneath the interfacing slot there is a void designed for cable trunking. The inner cover (component F) is designed to prevent direct contact with the live parts in the case of removing the fascia for new cable routing or to perform maintenance. Cables are tied in place by tabs, and exit at the required location though holes punched in the skirting base.



PROPOSED MATERIAL

Needs to be robust, with good thermal and electrical insulation properties, and also very machinable thermoformable, or extrudable. Polycarbonate would be perfect for every required property, but it;s too expensive, so perhaps should be uPVC - for similar characteristics to Polycarbonate, but at better value costwise.

PROPOSED MANUFACTURING PROCESS

The part is intended to be produced as strips and in varying lengths - and in some cases the longer the better. Injection moulding is not suitable due to undercuts, so the part should be extruded to accomodate the undercuts in the profile and also so that the parts can be made in very long lengths then cut down to size. Screw holes then punched and coutersunk.

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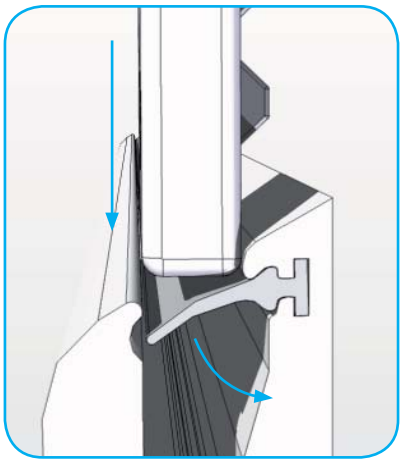
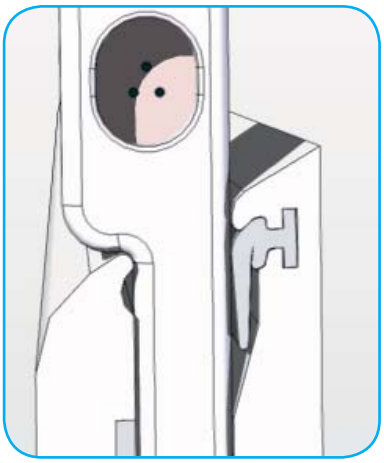
B Rubber Lip

SLOT PROTECTION

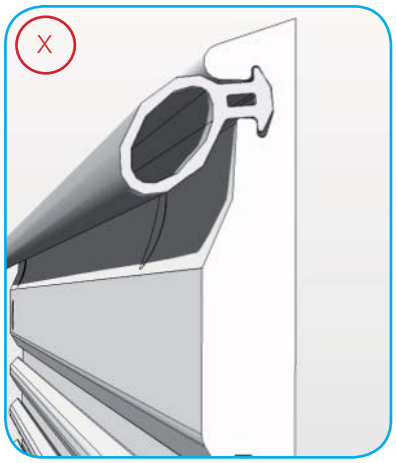
A rubber seal spans the slot gap tightly to prevent dust and foreign objects from accidentally falling into the slot, also needs a certain aesthetic quality. The lip needs to fold down easily when the plug is inserted without pinching or splitting, and because the act of inserting and removing will be wearing, it needs to be sturdy and have good memory/shape recovery.

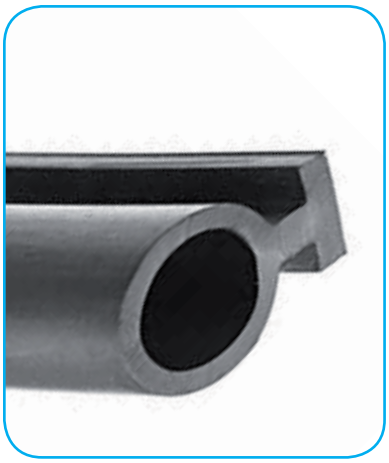




BULB SEAL

Initially a bulb seal was considered, as it was thought it would be stronger at the folds. Also refering to the Eubic system once again, the front facing slot is protected by two bulb seals in either edge and works well for recovery.

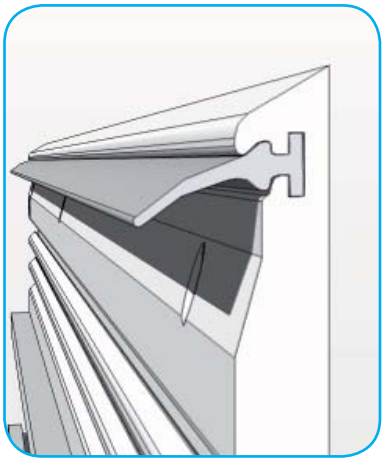


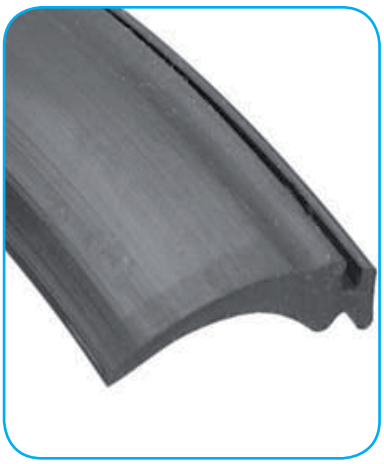


http://www.sealsdirect.co.uk OWS781

BLADE SEAL

The decision was to go with a blade seal at this stage, as the slot is only 12mm, and the recess it folds down into need not be so deep and therefore weaken the back plate.





http://www.sealsdirect.co.uk OWS778

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PROPOSED MATERIAL

If buying in needs to be white or light grey in colour, which is rare. Silicon and foam rubber was considered, but the decision was to go with rubber as it's more robust and has best memory.

PROPOSED MANUFACTURING PROCESS

Extruded in maximum lengths then cut down to slot into each individual length of backboard.

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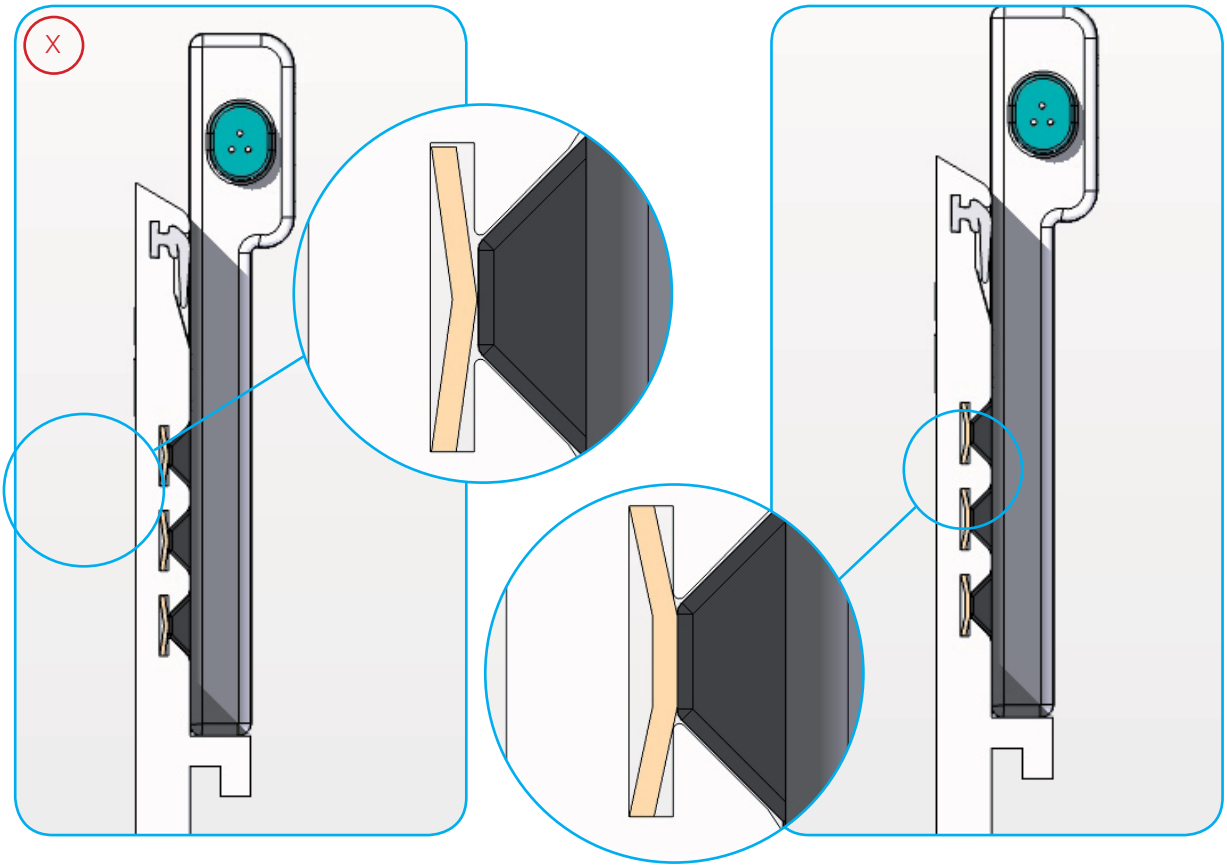
C Conductors

PROFILE

The conductors to slot into the keyway in the back panel without weakening it too much, maintaining it's slim profile.

To make suitable for low voltage confiugurations, the conductors need to be rated for a proportionately larger current, so this determines which materials and how much cross-sectional area is necessary to amke safe and to comply with regulations. Also the area of the face that contacts with the plug conductors needs to be sufficient size to comply with regulations, and with sufficient force to prevent 'arcing'.



Circular or 'v' shaped - not chosen as although the spring and therefore pressure is acheived, the area contacting with the plug is too small.

Flat peaked so that the face is flat, and the contact is sprung to maintain good pressure.

MATERIAL CHOICE

Copper Chromium, for it's high conductivity, and good resistance to corrosion and oxidation.

PROSED MANUFACTURING PROCESS

Machined from sheet copper or copper chromium, guillotined and folded.

Copyright 2011 Ashley Kelly

D Wiring Box

SUMMARY

A wiring box is required to connect the mains terminals to the conductors. Whilst the inner components were not concentrated on at this stage, due consideration has been given for the space this would require, and it's relation to the assembly. This was guaged by looking at similar wiring in boxes for example in the back boxes of the UK standard G type BS-1363 sockets, and also the Eubiq system.

The wiring in box would be a part bought seperately from the main skirting assembly depending on the configuration and how many final curcuits are present.

The mains wire would be fed through the hole in the back plate for skirting configurations, and wired in to the respective conductors in the wiring box. The box is then fixed to the skirting by screws, and a cover screwed on to conceal the live parts. Once in place the inner cover is then fixed over the box.

PROPOSED MATERIAL

Flame retardant uPVC This is generally the material used for wall plugs and sockets for it's good electrical and heat resisitance, and low cost.

PROPOSED MANUFACURING PROCESS

Injection Moulded

Copyright 2011 Ashley Kelly

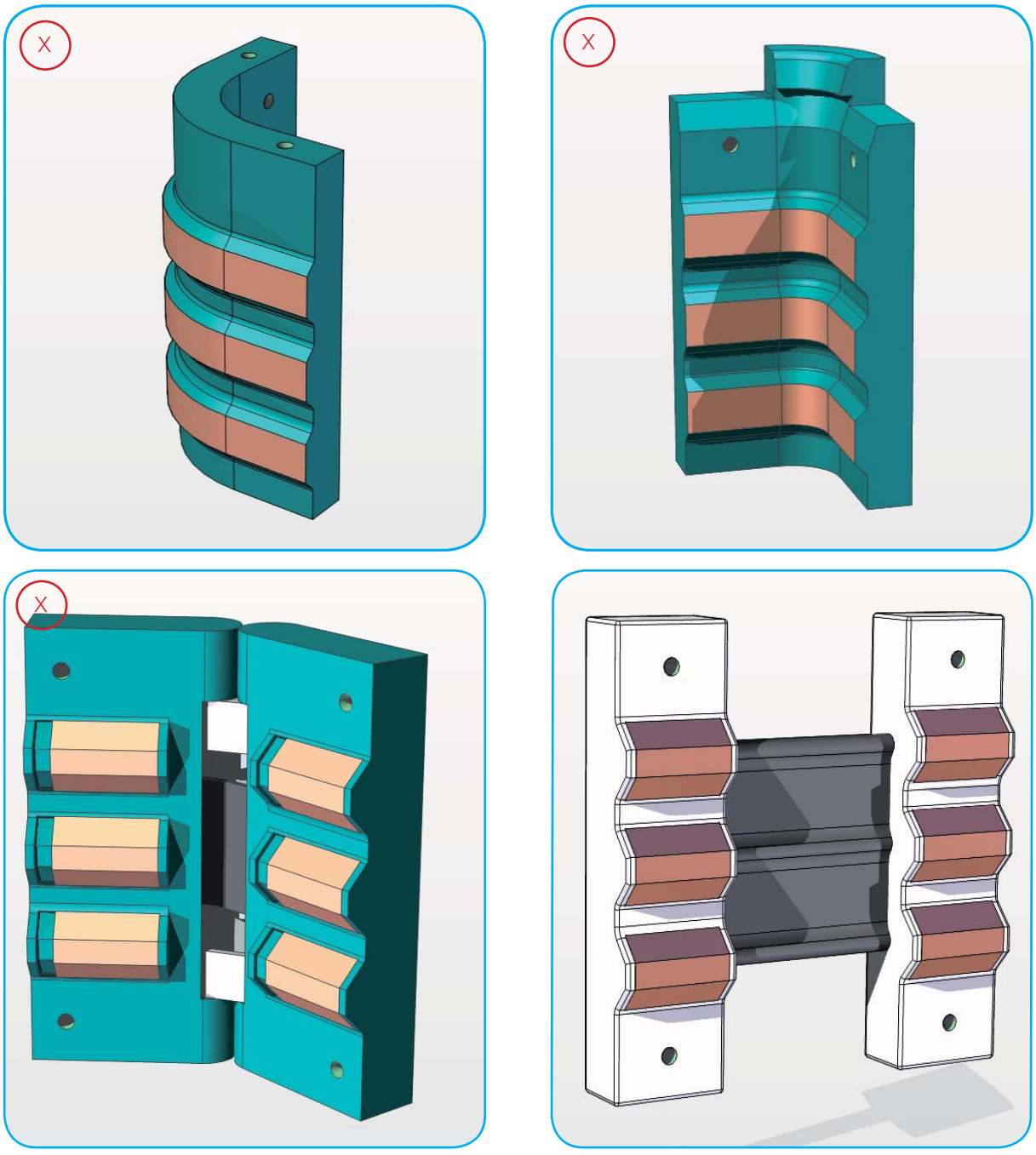
E Couplers

SUMMARY

The system comes in kit form, and the skirting would come in various lengths, from 1 to 4m. As with the existing track systems, to install it around corners and run longer lengths than 4m it requires couplers and end caps.

The goal when designing the hinge was not just to make the part as 'one-fits all', but to keep the conductors insulated when the fascia is removed for additional trunking work or maintenance. They also act as spacers for the inner cover, maintaining a the slot gap along it's length.

DEVELOPMENT



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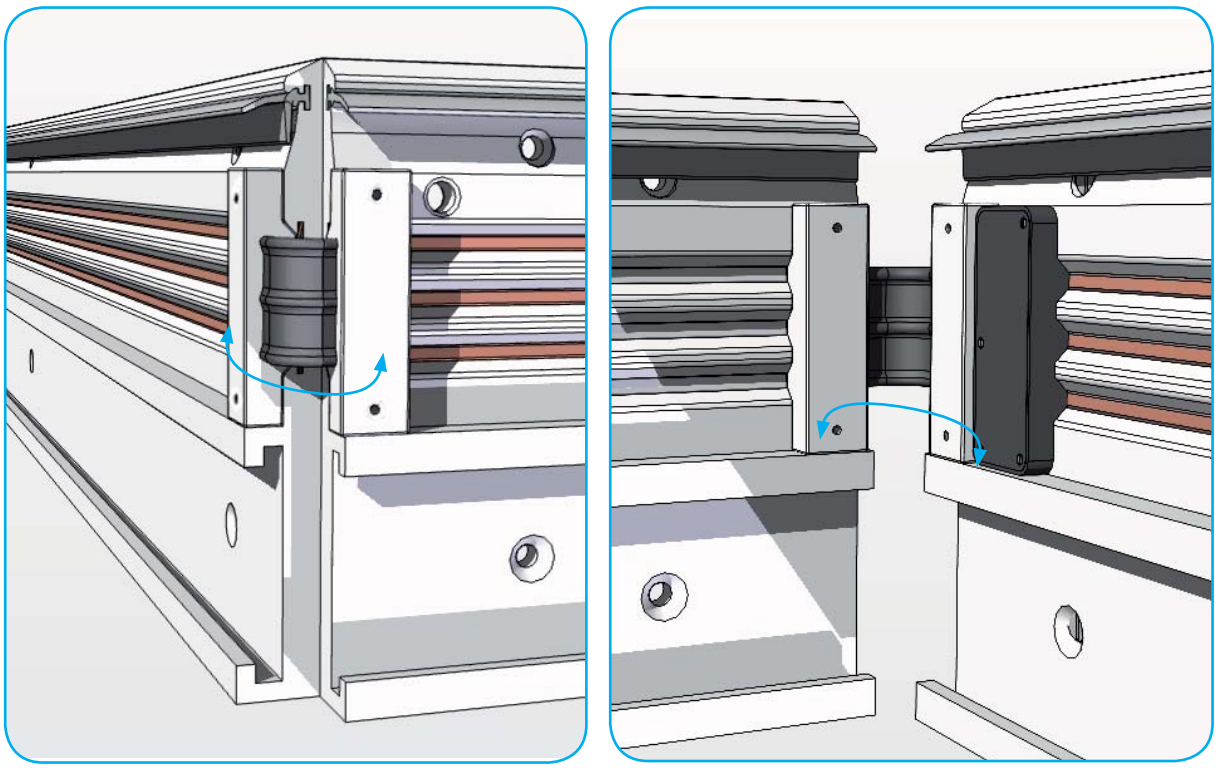


The couplers have have been designed so that one parts does the job for all internal, external and straight butting, and these also take care of indiscrepancies in corner angles, bay windows etc by way of a flexible ribbon. Couplers are fitted to the back panel and held in place by the inner cover which screws through both parts into the back panel.

PROPOSED MATERIAL

Due to it's robustness and flame retardant properties, Phenolic PF Phenol Formaldehyde is proposed for the interfacing parts as this is generally the material used for wall plugs and sockets for it's good electrical and heat resisitance, and low cost. and the ribbons from flexible PVC, as used for conventional cable sheathing again for it's flame retardant and cost effective properties.

PROPOSED MANUFACURING PROCESS

Injection moulded for the interfacing parts, and for the ribbon sheath

Copyright 2011 Ashley Kelly

F Inner Cover

SUMMARY

The inner cover is a simple part but is necessary to keep the live parts concealed when the fascia is removed to re-route cable trunking or perform simple maintenance.

It is fixed by hooking onto the back panel and screwing through the couplers, so it also acts as a clamp for the couplers.

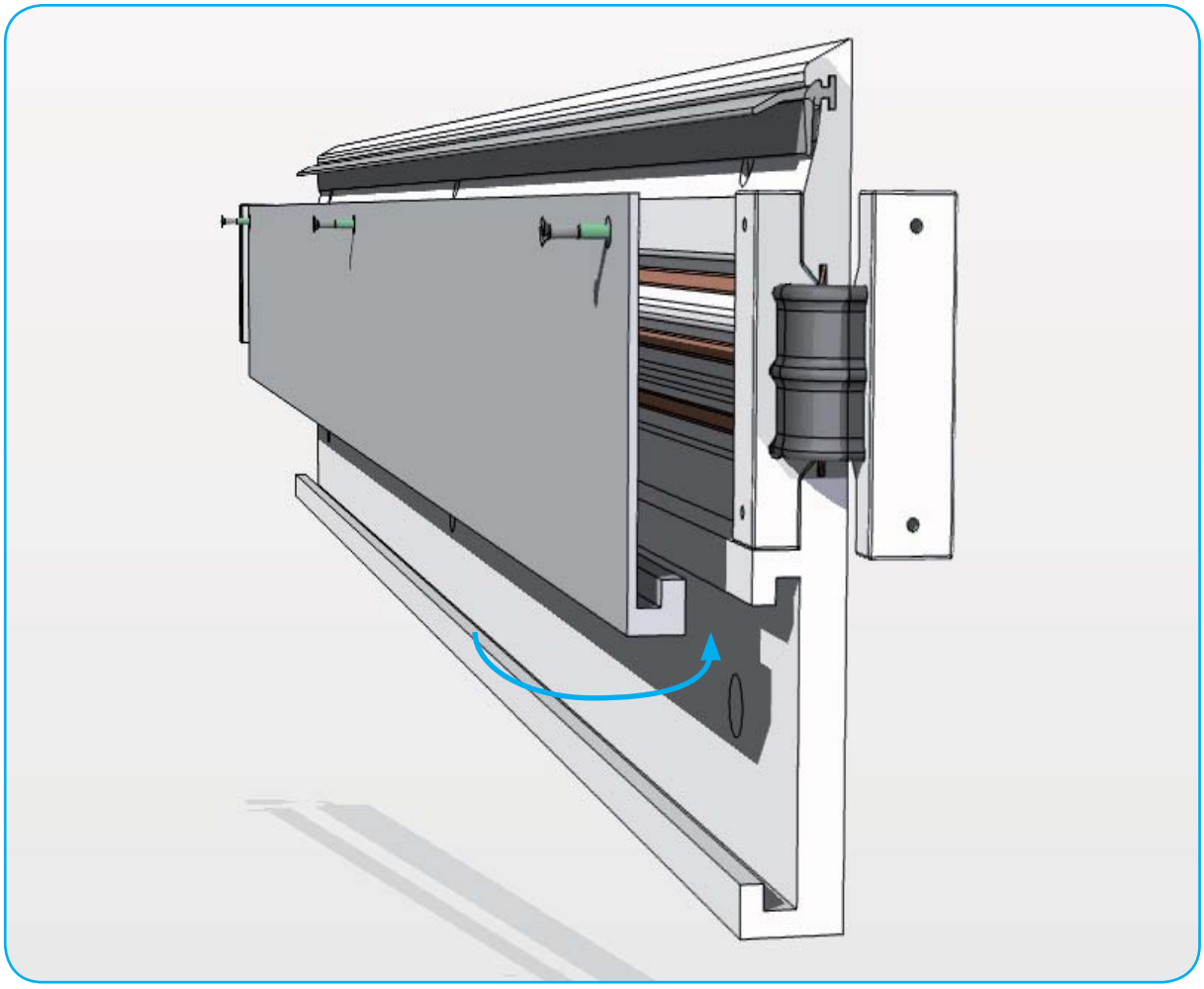
Whilst the material chosen will give the part stiffness, extra spacers are required at 500mm intervals to maintain the slot width and therefore the pressure on the plug contacts.

MATERIAL CHOICE

Again, flame retardant uPVC This is generally the material used for wall plugs and sockets for it's good electrical and heat resisitance, and low cost.

PROPOSED MANUFACURING PROCESS

Extruded, with extra spacers made from extruded square rods.



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G Fascia

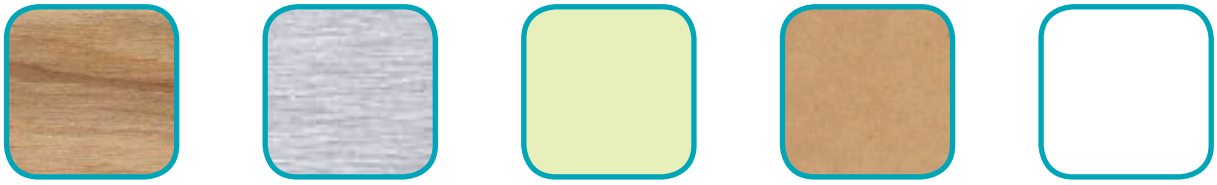
SUMMARY

The fascia is one of the major differences in aesthetics between the ALLSocket and other power track systems. Because it can have any finish, it is the part which makes the skirting look like traditional skirting, and hide it's true function.

It can be removed easily to access cable trunking by popping the snap fit corner covers off and unclipping the snap fasteners just under the rubber lip with a plastic tool. Then the fascia can be removed (in the case of mitred fittings slid upwards.

PROPOSED MATERIAL

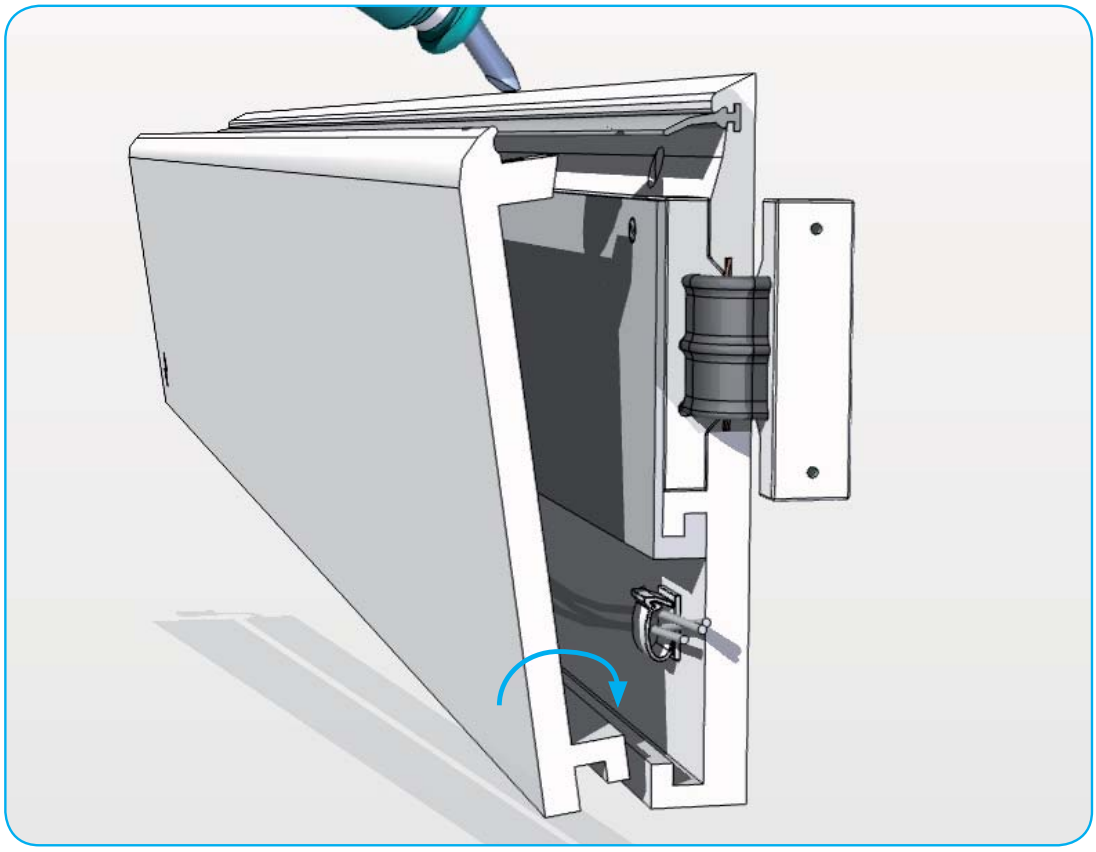
Flame retardant uPVC with a variety of finishes, painted, powder coated, laminated, etc.



Woods | Metals | Soft-touch | Unfinished | Plain gloss

PROPOSED MANUFACURING PROCESS

Extruded



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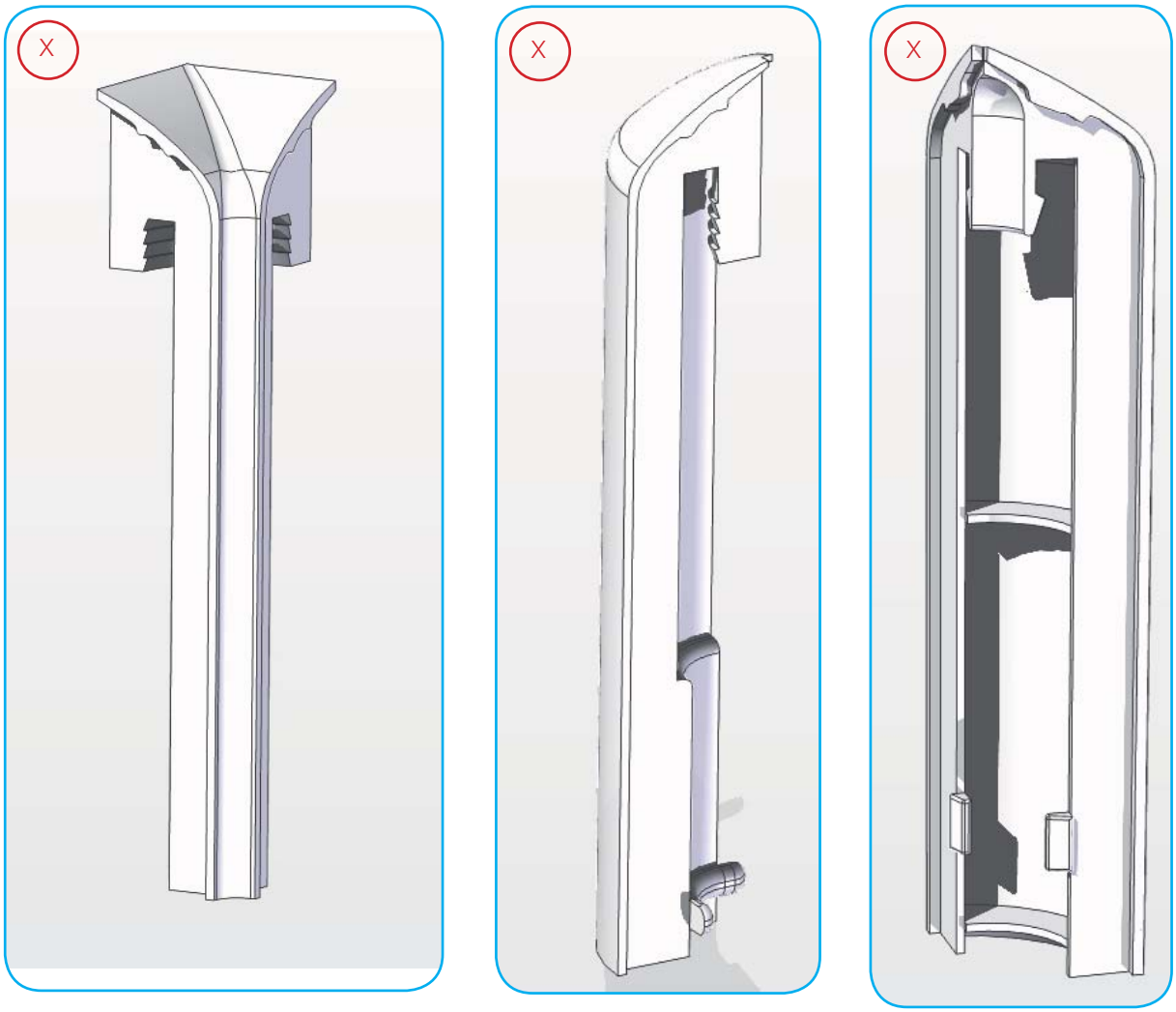
H Corner and End Caps

SUMMARY

Whilst the skirting is also supplied with one edge mitred and can also be cut and butted in the same way as covnetional skirting, corner and end caps are also provided to give it a complete finish. The corner caps fix over the corner couplers and slide down over the corner fascias.

DEVELOPMENT



Methods for snapping in place have been explored by snapping onto the couplers, but this means the couplers would be more complex and possibly jeapordise the mechanical strength of the coupler contact.

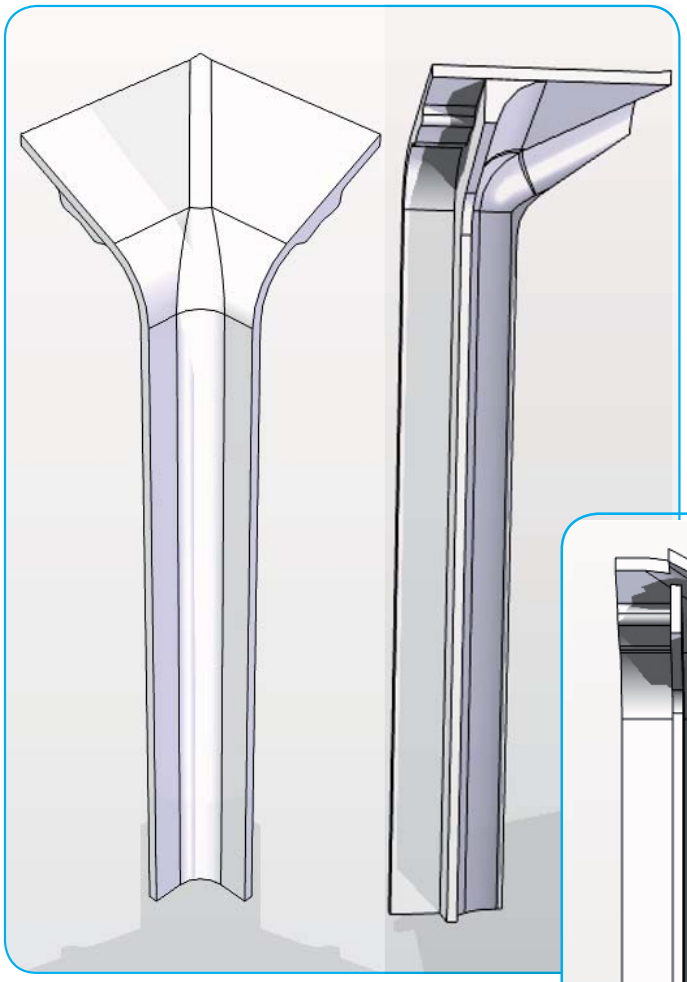
With simpler ribs running down the inside, the angle of the an internal corner means the ribs if the internal cap will hold into place when it's slid over the skirting. For the external corner an additional means of fixing perhaps by tabs or an extra internal brace will be necessary.

PROPOSED MATERIAL

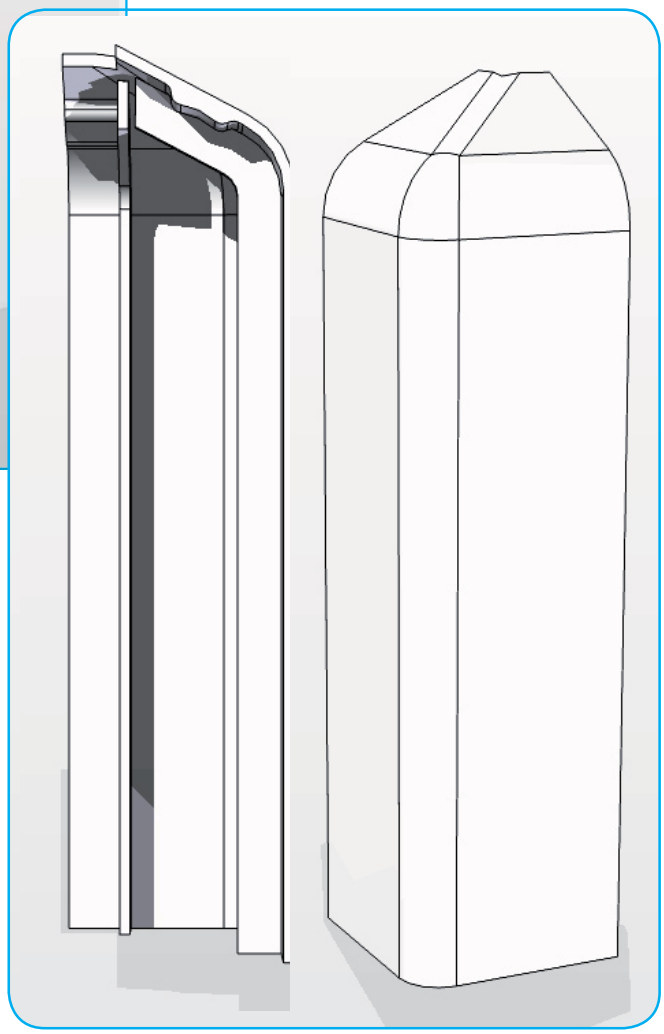
A good deal of flexibility is rquired for these parts, so flame retardant PVC would be best suited.

PROPOSED MANUFACURING PROCESS

Injection Moulded



Internal Corner Cap



External Corner Cap

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5.2 ALLPlugs

5.2.1 Summary

The ALLPlugs have been design to be as slim as possible without compromising on strength.

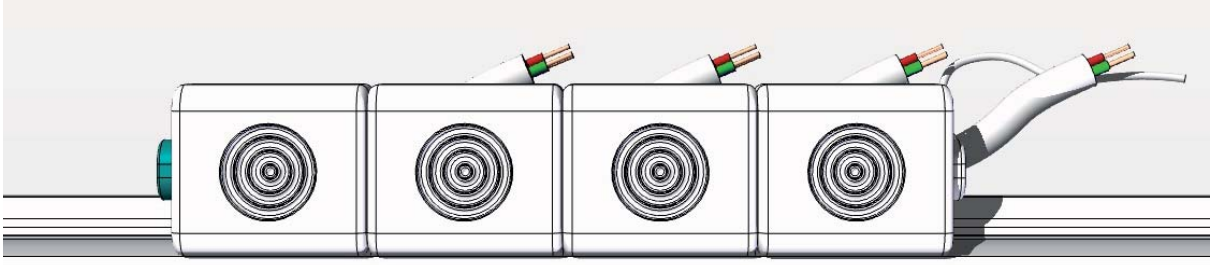
The head of the plug houses the majority of the switching circuit for the IR, USB and wireless feature, and attention was paid to the ergonomics of this part for it's the part which will be gripped for removal and insertion. So whilst the idea is to get the part as inconspicusous as possible, it can't be so small that it will be too difficult to handle, or to grip, expecially as some force will be required to remove the plug as required by regulations.

Various shapes and profiles were considered for the ALLPlug, and the one settled on was for it's clean lines giving a continuity and complimenting the skirting, especially when the ALLPlugs are 'chain ganged'.

Since the system ring mains will be protected by RCD's, ALLPlugs are unfused.

5.2.2 Objectives

- Small yet robust
- Aesthetics - non-imposing and as inconspicuous as possible
- Ergonomics – suitable for 90 percentile handling
- Economics – every plug to have a remote power cut feature – activated by an of: IR, USB, or RF
- Large enough to contain circuitry for standby eliminator function
- As few as possible moving parts
- Connectivity – strength and robustness of connecting contacts
- Compatible with 240v AC and 12v DC systems (ie pv panels and wind turbines)
- Compliance with BS/EU regulations



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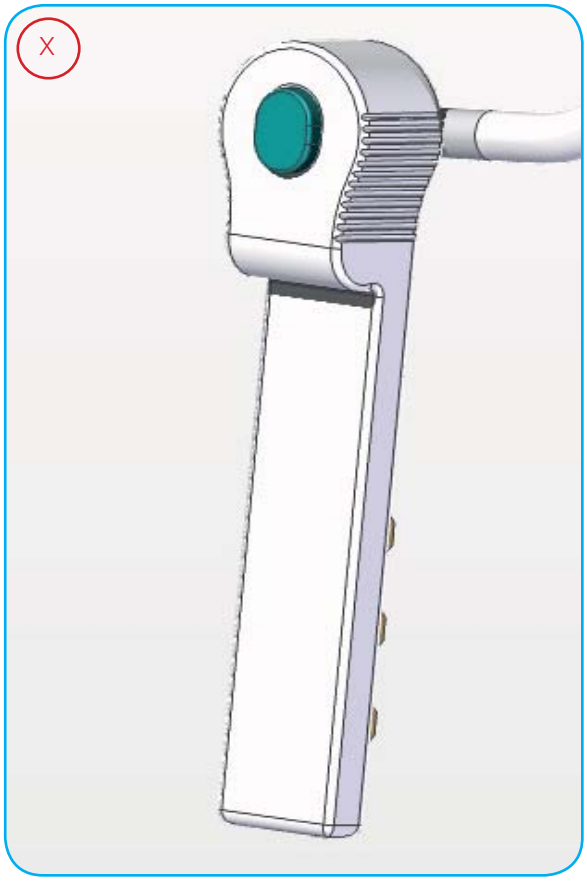
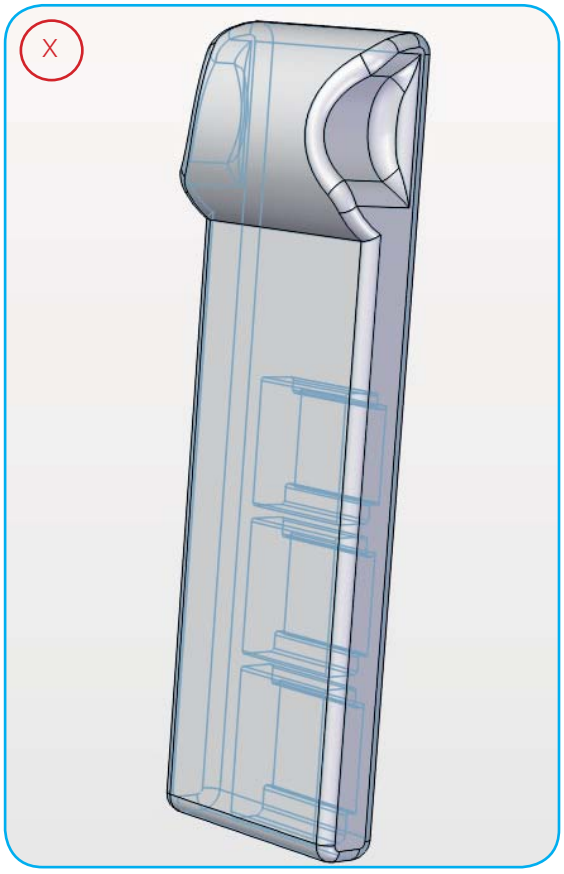
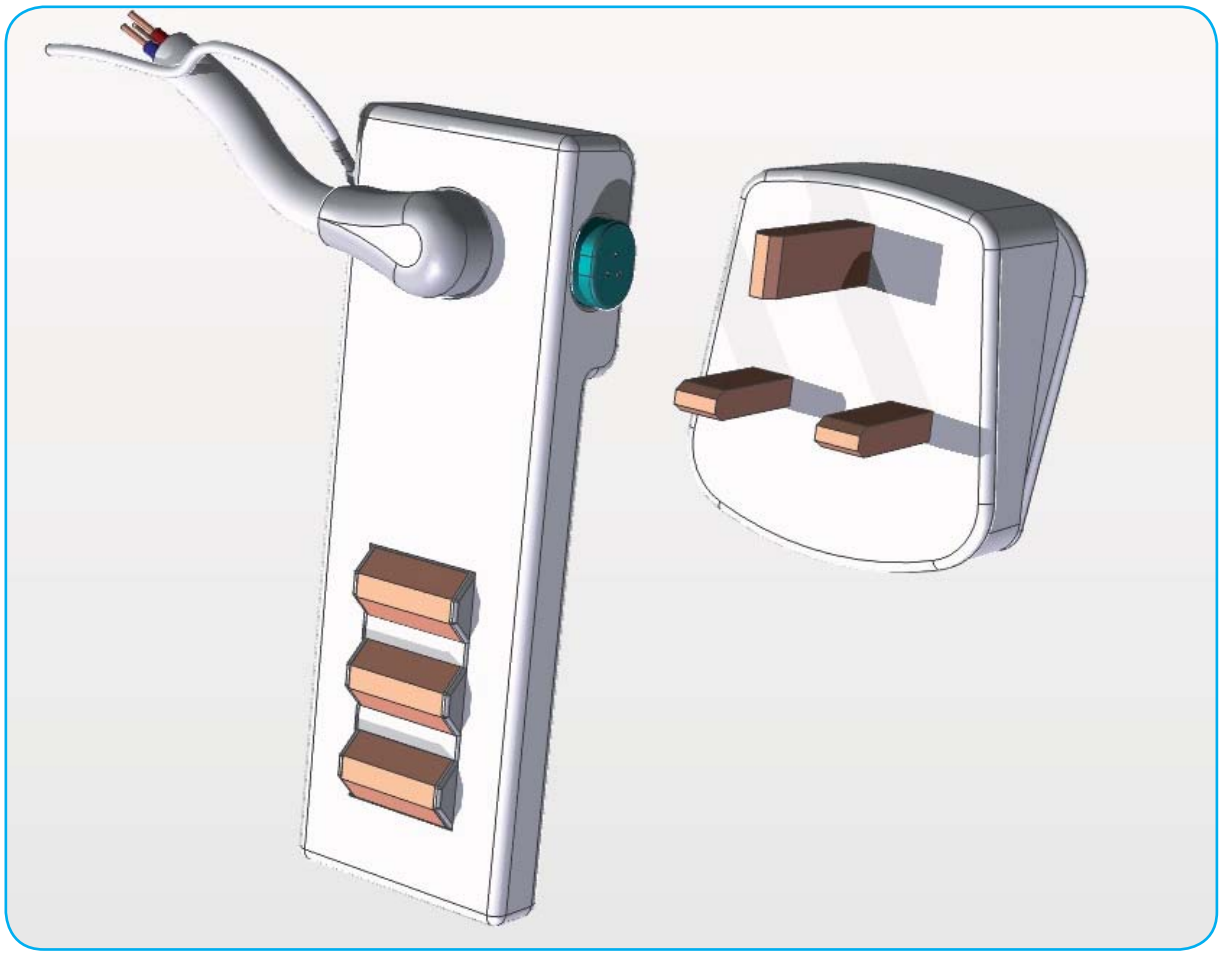
5.2.3 Idea Generation







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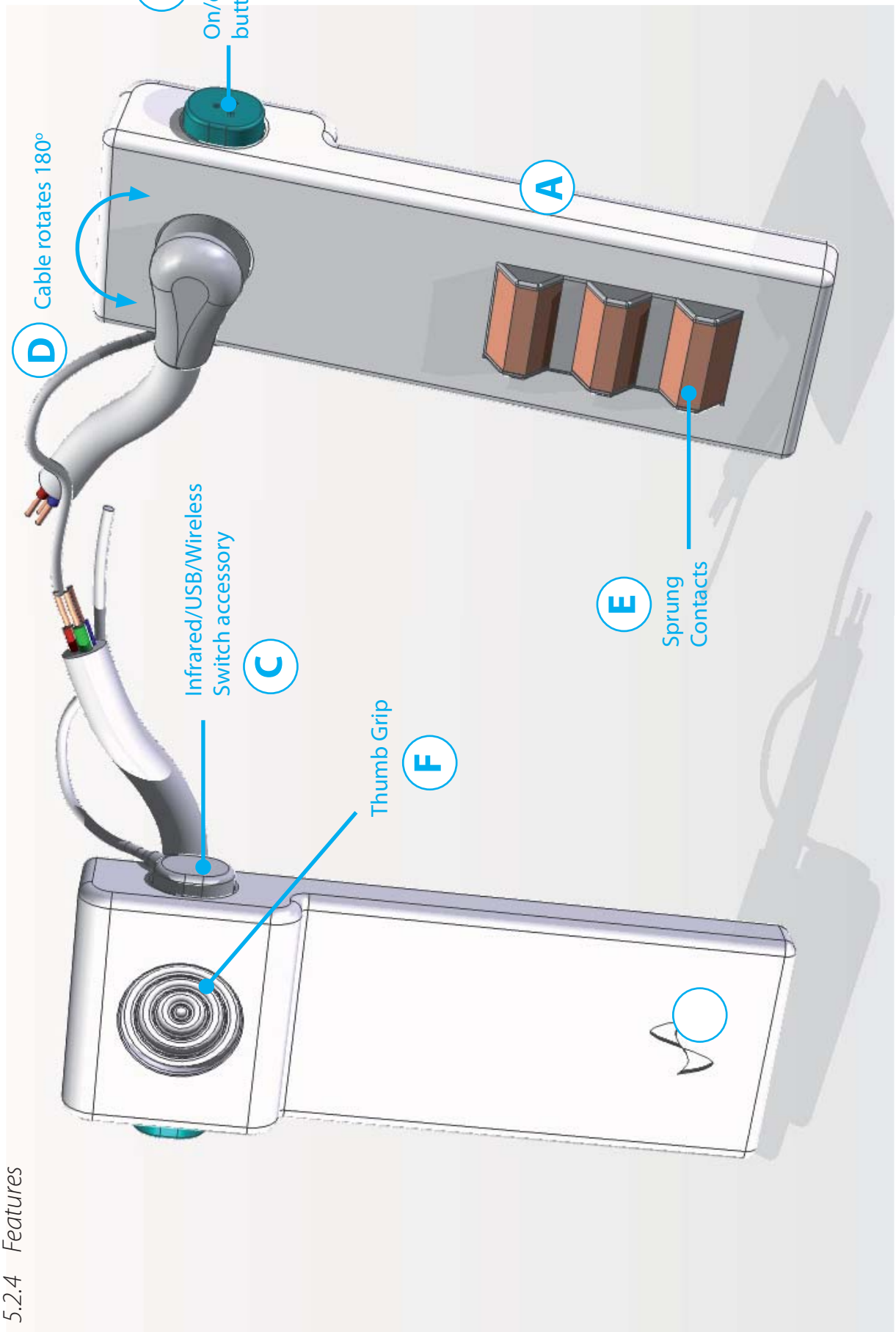
5.2.4 *Features*



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5.2.5 Design Rationale and Iterations

A ALLPlug Casing

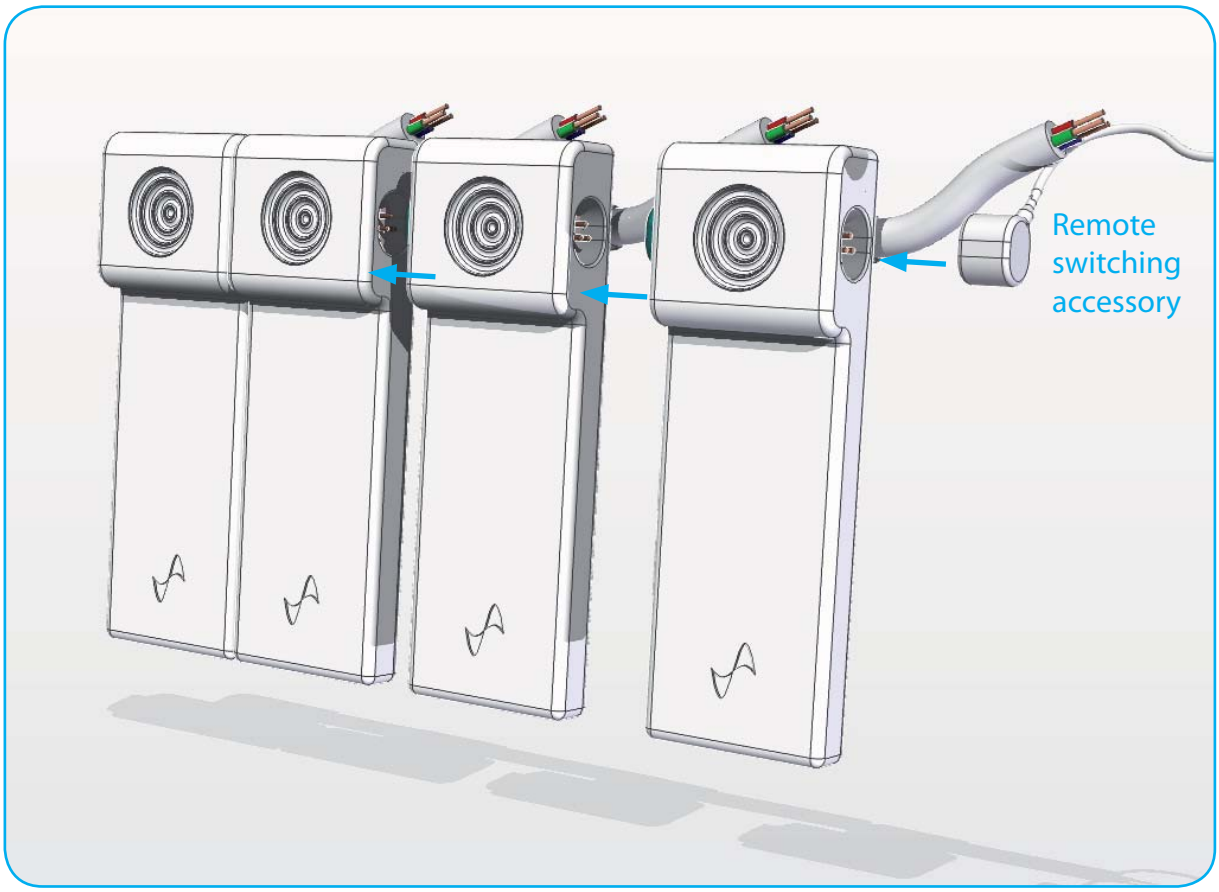
FUNCTION

A big difference between the existing 'G' type 3 pin system is that the switch to cut the power is on the plugs instead of the sockets. This was to enable each plug to be switched on and off individually by any one of the standby saving accessories. Referring to other standby saving products on the market, they all operate by by being the intermediate and extra piece in the system, whereas the ALLPlugs have it inherently built in.

Before any of the ALLPlugs can be controlled by any one of the accessories, it must be manually switched on by this switch.

On the opposite side of the switch is a socket of inverse profile to the switch, and when you 'chain gang' a number of plugs together along the ALLSocket slot, they neatly plug into each other.

The rightmost ALLPlug's vacant socket is then the only one available to receive one of the remote switching accessories, terminated with a plug of the same profile. This is the master ALLPlug, and when the remote switching accessory receives a signal to switch off, all plugs in the chain do so.



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FORM

As an objective was for the plugs to be as inconspicuous as possible, the plug takes to form of straight, clean lines. This is also more practical for the 'chain ganging' function as they all butt up together, The only exception to this is the thumb grip detail on the front of the plug, which is a circular, concave feature with ridges.

The size of the plug overall is bigger that the UK G type BS 1363 plug, but it is less bulky, and once it is in place in the ALLSocket track the only visible part is the head, which is smaller than the G type. The head also houses the majority of the remote switching circuit.

The 'card' part of the ALLPlug which slots into the ALLSocket track is a sturdy 10mm thick, and the sprung contacts receed back into this part when the plug is being inserted.

PROPOSED MATERIAL

For it's toughness and rigidity (for strength in it's slimmest part), scratch proofed, flame retardant polycarbonate.

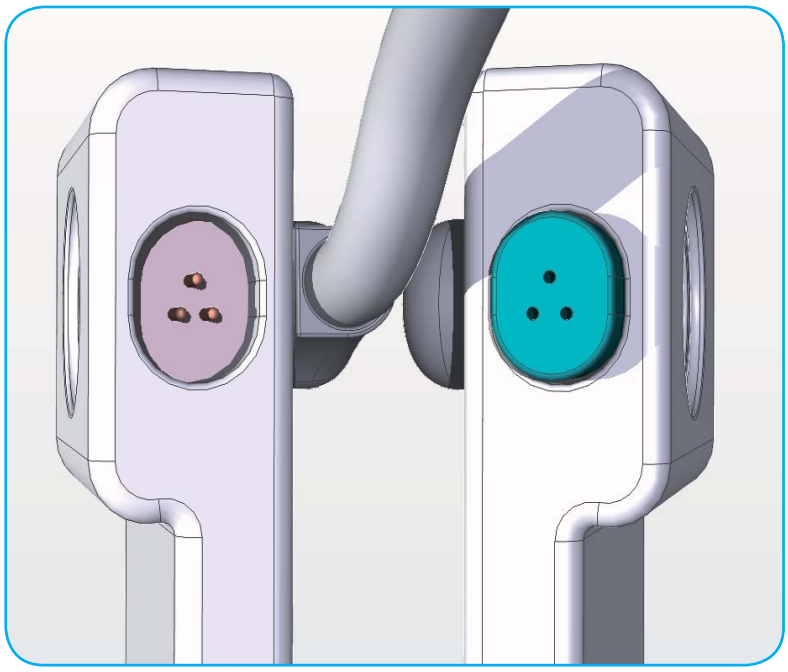
PROPOSED MANUFACTURING PROCESS

Injection moulded.

B On/off push button switch

FUNCTION

The switch is the same profile as the socket for the IR, USB and RF accessories. It mechanically operates a circuit switch and as previously mentioned is required to be switched on before it can be controlled by any remote switching accessory. If this switch is not on, it is not possible to for the ALLPlugs to 'butt up' completely.



PROPOSED MATERIAL

PVC

PROPOSED MANUFACTURING PROCESS

Injection moulded or cast.

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C Infrared/USB or RF Accessory

FUNCTION

For remote switching on and off, there will be three accessories available, an IR eye and a USB cable both with 1 or 2 metre cables terminated with a bespoke plug of the same dimensions as the on/off button.

This enables every plug to be able to be ALLPlug to be 'chain ganged'.

- The IR will be programmable to a chosen button on any remote control handset, usually the television one. So when the television is switched off and no longer in use, all peripheral equipment whose ALLPlug is 'chain ganged' to it's own will also have it's power switched off.
- The USB will operate to switch off the power to it's chain gang when the computer it's connected to shuts down. To switch the computer back on again, a button on the USB end is required to switch the power back on to the ALLPlug.
- The Radio Frequency accessory is a switch and a receiver. The receiver plugd into the ALLPlug's socket, and switches all the ganged plugs off when a switch on the wall is operated, as per the 'Bye Bye Standby' product (among others) on the market. One switch can operate any number of receivers within range, so a whole room-full of unessential items can be switched off in one flick.

They all plug in to the right hand side of the plug and the control signal is passed through three pins of the type found in D connectors.

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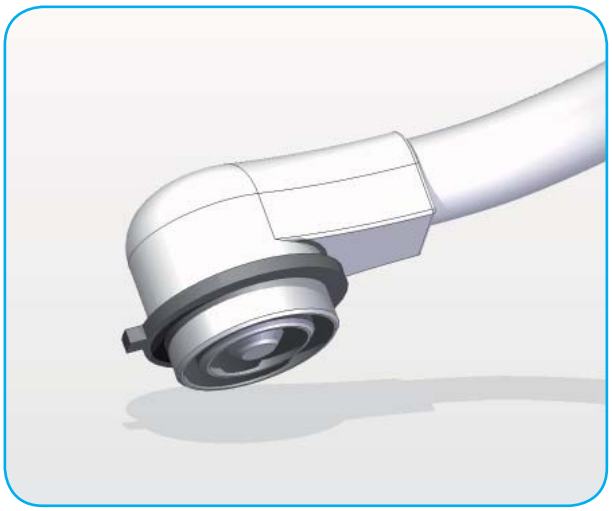
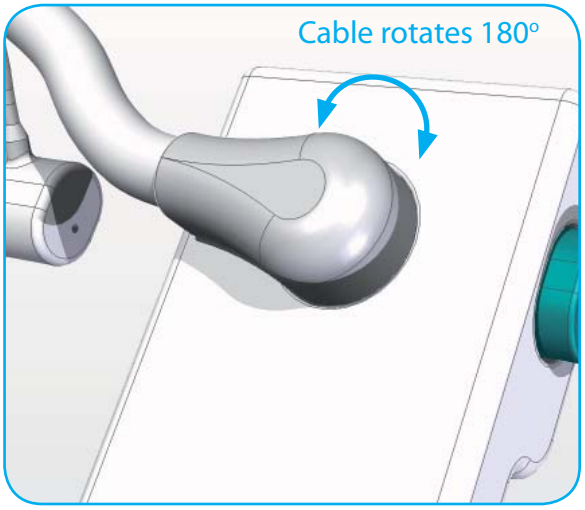
D Cable Rotator

FUNCTION

The cable enters through the back of the plug via this rotator, and is able to swivel almost180° to enable the cables to run either left or right (or upright) along the skirting.

Further development aiming to make this part the re-wireable part of the ALLPlug (rather than being rewired by opening up the ALLPlug casing) will be carried out, so it's likely that it will become a larger component.





PROPOSED MANUFACTURING METHOD (not including the inner components)

Injection moulded or cast for the outer casing.

PROPOSED MATERIAL

Flame retardant PVC

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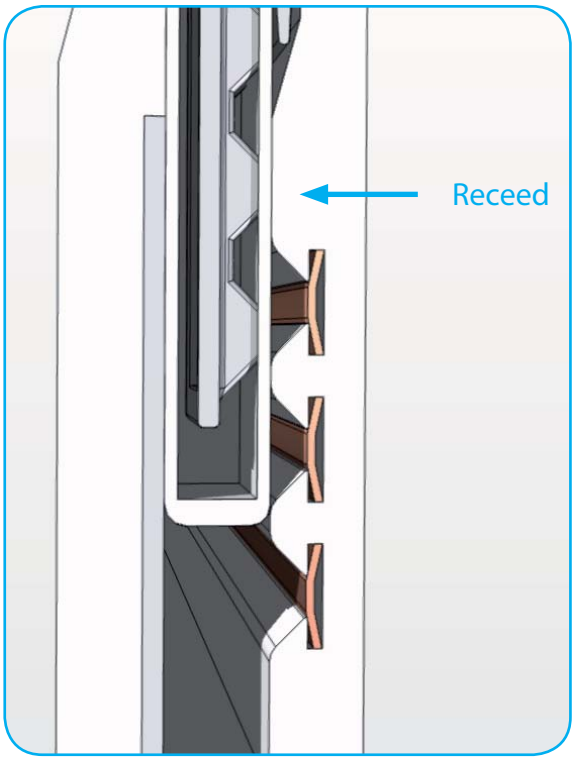
E Sprung Contact Chassis

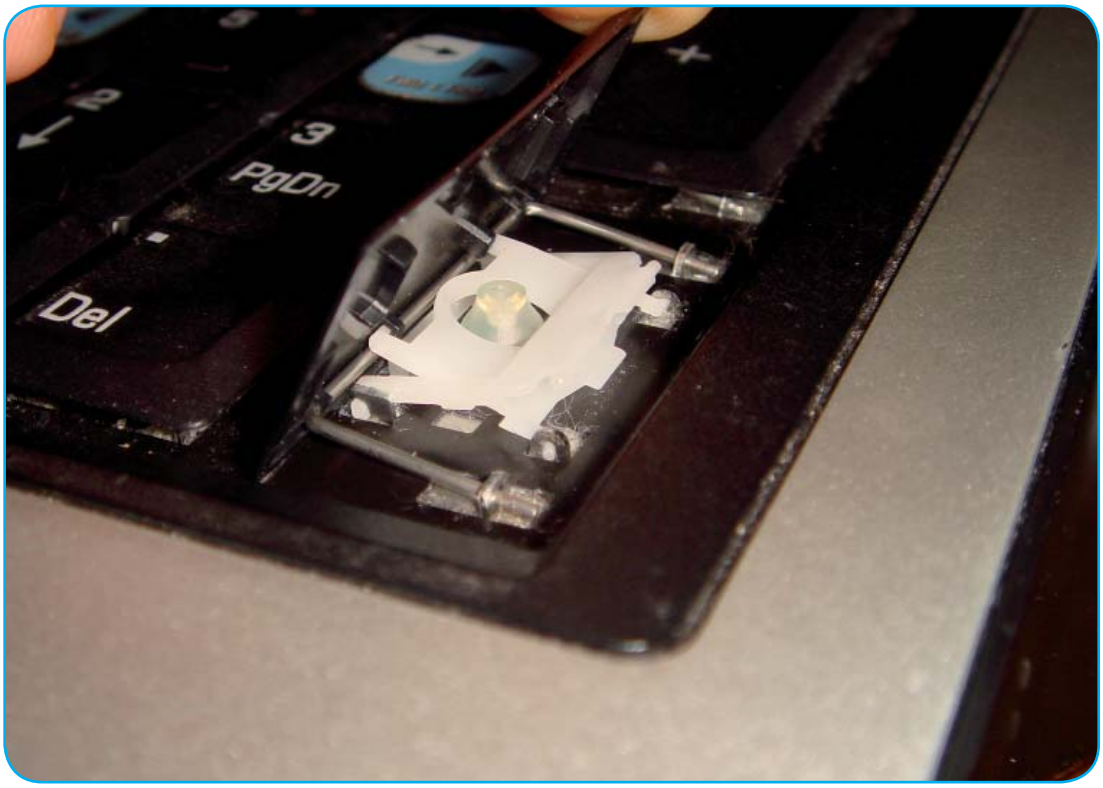
FUNCTION

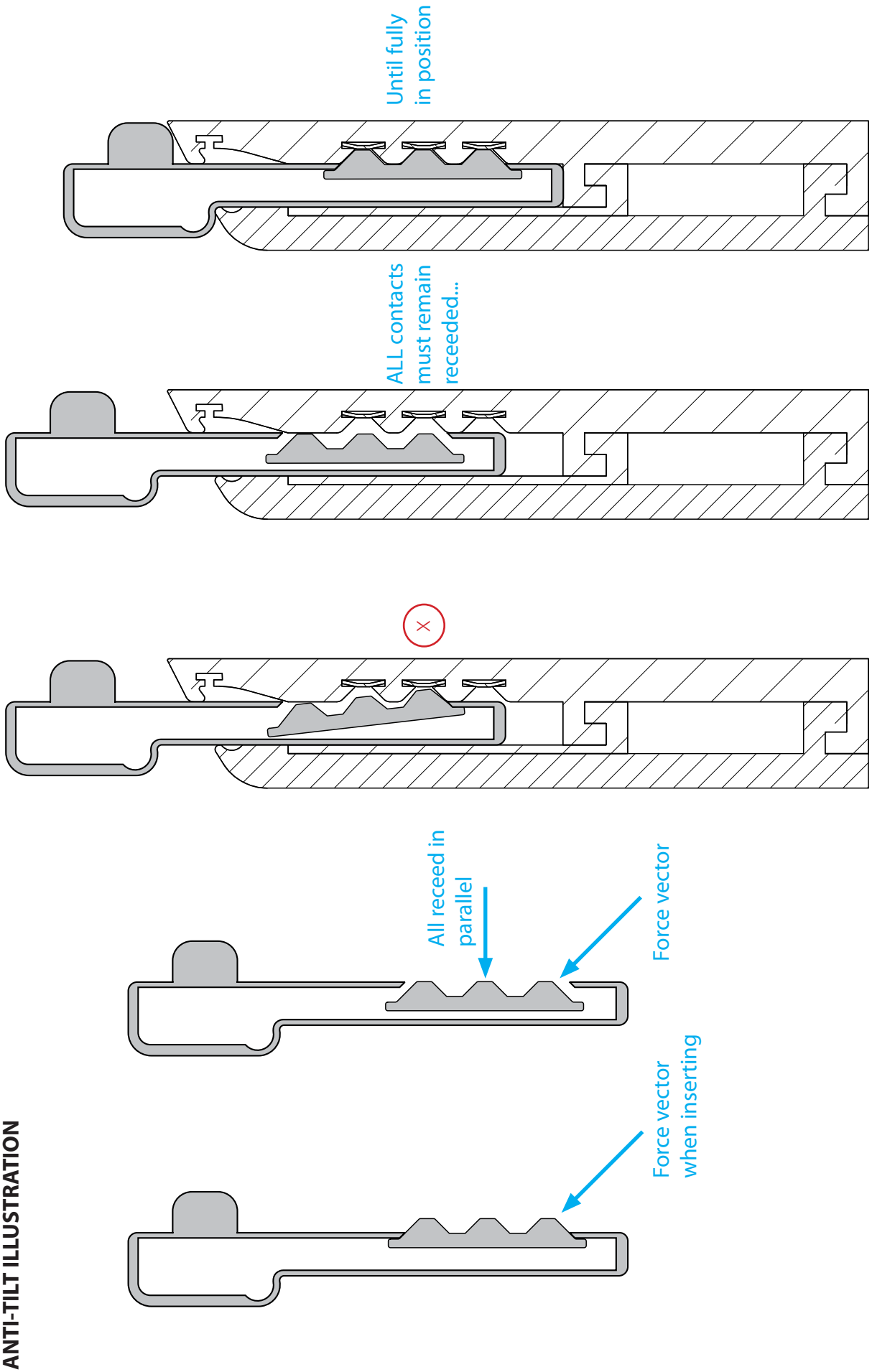


The trickiest and most delicate part of the design, when the ALLPlug is slotted into the skirting track, the sprung contacts need to receed in a parallel manner until ALL contacts are in the correct place. This is to prevent the contacts from springing forward into the incorrect channel for it's polarity and therefere shortening the sweep distance, risking arcing and not conforming to IEE Wiring Regulations.

The challenge here is that there is the limited space as it's in the slimmest part of the ALLPlug. This means that there is limited space behind the contact chassis for the chosen spring mechanism, and also tolerances in the spring movement must be minute. A graphcal illustration is shown next page.

The solution to this can be found in laptop keyboards. The keys are snapped onto a three way lever mechanism to prevent the buttons from tilting and consequently jammin. These mechanisms are able to do this for extrememly small movements - a Toshiba Satellite pro for example keeps a key parallel when being depressed for 3mm and the mechanism requires just 2mm space to operate.





ANTI-TILT ILLUSTRATION

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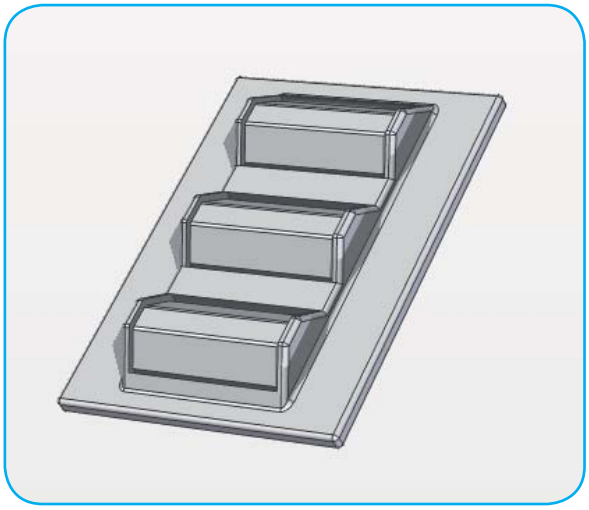
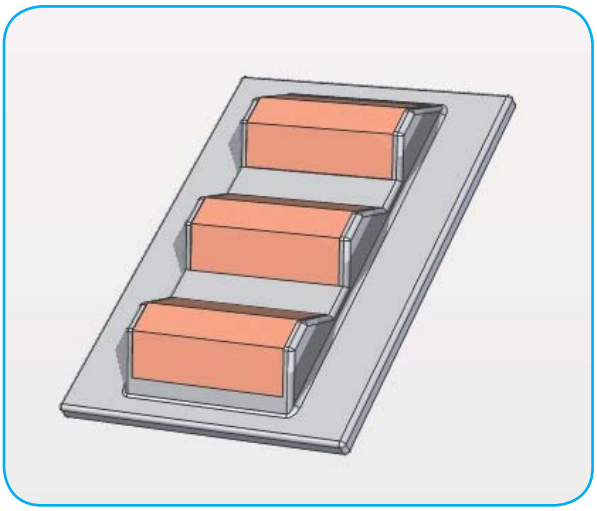
FORM

The three copper contacts are wrapped over the three pins and fed into slots through to the inside of the ALLPlug, where they are connected to the internal wiring. The pin sides are set at 45° so they can slide in to the recess easily.





PROPOSED MATERIAL

Flame retardant PVC

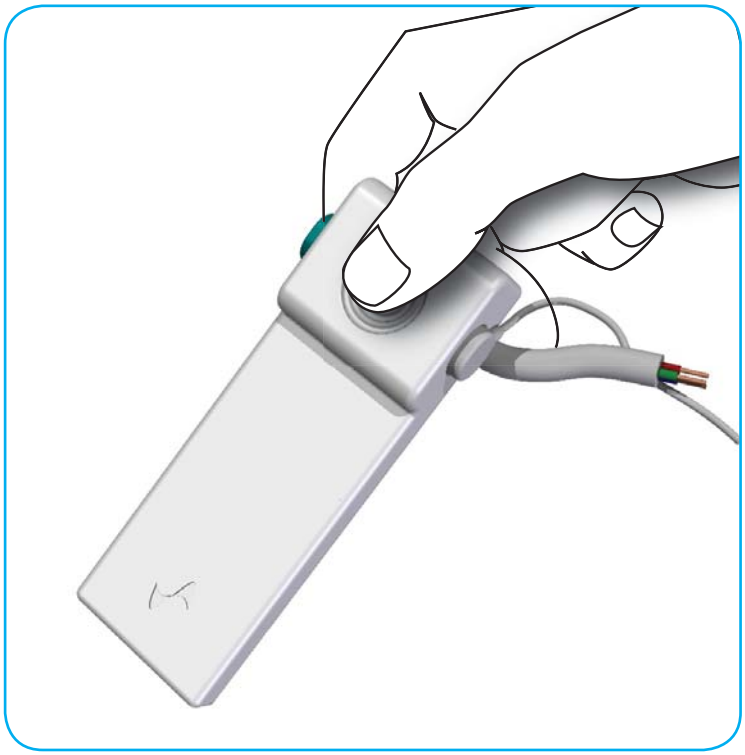
PROPOSED MANUFCTURING PROCESS

Injection moulded

F Thumb Grip

FUNCTION

On the face of the ALLPlug is a thumb grip, to enable the user to pull out the switch easily.



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6.0 Accessories

There is scope for many accessories - adaptors for G type plugs, variable voltage adaptors, lights, etc.

Here is what 3 pin G type adaptors may look like. These can also house the same circuitry which operates with all three remote switching accessories.

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7.0 Costings

7.2.1 Manufacture

Based on comparisons with 5 other track systems[1] it's estimated that the system would cost £8-10 per 3 metre length to manufacture (including associated accessories). Thus coming in under the £3 per metre quoted in the Product Design Specification.

7.2.2 RRP

On average the comparative systems retail at £80-100 per 3 metre strip (with accessories).

Bearing in mind all track systems are operate by requiring back boxes and standard G type double sockets at fixed locations, and therfore ALLSocket carries a specific advantage over these systems.

The Eubiq system, which is the closest in principle to ALLSocket, retails for substaintially more than this, coming in at a whopping £90 for a 30cm strip. That's £270 in comparison.

Assuming ALLSocket can be marketed somewhere inbetween these two at £150 per 3 meters, the profit margin is favourable.

1 Methodology: Comparisons of 5 other systems averaged. 3m lengths, 5 double sockets outlets, one internal and one external corner. Assumptions manufacture to outlet - 10:1

8.0 Market Planning

8.1 Route To Market

ALLSocket once fully developed would be looking for third party licencees, from large Electrical Installation manufacturers such as MK Electric, Mita, Masterplug, Powerplan, Electrak International, Marshall Tufflex.

8.1.1 Market Opportunites

- New Builds

  Developers are building around 160,000 new homes per year in the UK, with the Government setting a target to build an additional 200,000 new homes by 2016

  National Home Builders Council April 2008

- Renovations

  The government's Survey of English Housing found for 2005 -06 showed that 656,000 people borrowed an average of £33,000 each in each of the past three years.

  Of these, 56% spent some of the money on improvements, 29% paid off debts, and 15% bought goods for the home.

  Despite predictions of a home renovation industry slowdown, Travis Perkins, the building supplier and home improvement retailer, has announced in their annual report and accounts an increase in profitability - suggesting that the market remains robust.

  Figures for August show that profit augmented by 16.5 per cent. What's more, the turnover for Travis Perkins, which recently acquired seven Focus DIY stores to supplement its Wickes home improvement chain, has risen by 11.3 per cent for the first nine months of the year on last year's equivalent figures.

  The Wickes branch itself saw total turnover rise by 8.5 per cent for the nine months to September 29th and like-for-like sales improved by 5.7 per cent.

  Travis Perkins added that they expected growth to continue into 2008 and beyond - thereby providing an optimistic view of the health of the home renovation market.

  Travis Perkins Annual Report and Accounts 2007

- DIY Market

  The DIY market shows a shift from do it yourself to DFY - done for you. And there is a large trend towards tradesmen. There appears to be a shift from DIY to getting tradesmen in to do the job, with spending on the services of tradesmen to carry out maintenance and repair increasing almost three times faster than spending on materials between 2002 and 2006.

  Although perhaps not being exploited as fully as it could be, the opportunities for

promoting DIY as a benefit to the environment abound. In the areas of insulation, lighting and alternative power sources such as solar power new products are being developed that meet the demand arising from these trends (fuelled further by the introduction of HIPs).

B&Q has been keen to join the environmentally-friendly revolution and introduced over 100 'green' products in 2007, ranging from low energy light bulbs to solar panels and wind turbines. It is continuing to champion the energy saving message.

Currys began selling solar panels – priced at approximately £9,000 including installation. – in some of its stores at the end of July 2006.

Energy saving has many facets which should be driving new trade for the DIY business that is separate from home improvement for aesthetic or practical reasons. There is more scope for the market than is currently being obtained.

Home information packs (HIPs) – the new HIPs may have some impact on consumers' willingness to move, but overall they are likely to have a positive effect on the DIY market as consumers seek to make their homes more energy- and environmentally-efficient.

With the growing popularity of getting help in, especially for larger building projects, an important segment of sales comes from the small tradesman buying on behalf of the consumer.

MIntel DIY Review - UK - March 2008

- Green/Ethical Schemes and Government Incentives

In September 2006 British Gas launched a print and television campaign which advised consumers how to cut the amount they spend on gas and electricity by reducing their energy wastage.

Stern Review on The Economics of Climate Change, published by the UK Government in October 2006 - recommended action making global energy supply more efficient, and increasing support for energy research and development.

The government's programme of grants for householders to install renewable energy sources such as solar panels and wind turbines, which had an allocation of £3.5 million for the financial year to April 2007, ran out of funds in November 2006.

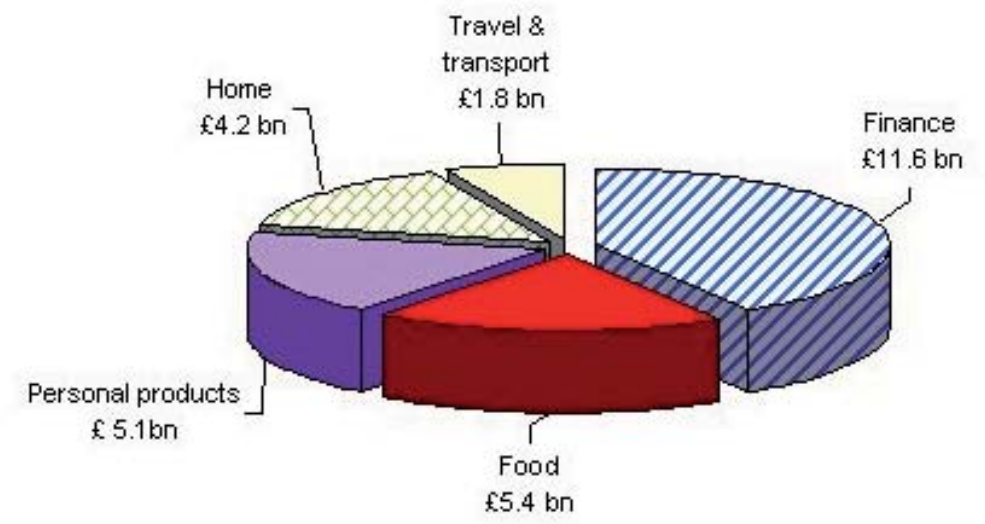
In the same month, B&Q announced that wind turbines, sold at £1,498 per unit, had become its strongest-selling item in value terms since they had appeared in-store in October. These strong sales were believed to be linked, at least in part, to the incentives discussed above.

The green movement is stimulating new product innovation, with the opportunities for developments in this area being numerous.

The desire for energy saving and the need to meet government and EEC regulations for new construction will help to sustain demand for insulation products, as well as other energy saving products such as various plumbing and heating products.

The annual Ethical Consumerism Report from the Co-op, which acts as a barometer of ethical spending in the UK, shows that in 2005 UK ethical consumerism was worth £29.3 billion. This represents growth of around 11% compared to the previous year

Green/Ethical consumerism in the UK, by sector, 2005



and over twice as much as in 2001

The Co-op's Ethical Consumerism Report also highlights increasing levels of interest in alternative energy sources. It shows that £54 million was spent on green energy in 2005 – an upturn of 42% compared to the previous year. Furthermore, £26 million was spent on micro-generation (ie home-based or small-scale energy generation) compared to £21 million in 2004.

General Electric has announced that sales of its products labelled "environmentally friendly" increased by 15% to $14 billion in 2007, as a result of a 38% increase in products in its Ecomagination range, including water filtration systems and energy saving light bulbs.

The introduction of the new HIPs packs will generate a greater demand for all products associated with both energy efficiency and environmental home management. Furthermore, with government grants for assistance with various projects in this domain there is a further catalyst for growth in volume.

Mintel Green and Ethical Consumers - UK - January 2007 Energy saving in the home

- Electricals

Household appliances spending up 8.3% from 2003-2008

Audio-visual, photo and information processing up 14.8%

Digital Switchover (between now and 2012) will increase demand

Mintel Electrical Retailing - UK - 2008

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8.1.2 End User Demographics

- Need for renewable energy is priority for 44% of people, with men being 58% of those
- Key age groups in the 'keen to be green': 35-44 and 55-64
- Very high proportion of ABs (42% are Keen to be Green)
- More likely to succeed in Scotland - as they are the ones mosk likely to say they'll participate in green energy issues if it directly saves them money!
- Nearly 6 in ten survey respondents expressed an interest in making major energy saving changes to their homes, such as installing solar panels
- Nearly six in ten respondents (58%) expressed an interest in making major energy-saving changes to their home, such as installing solar panels. Highest levels of interest were among:

  male respondents (61%, versus 54% of women)

  25-44-year-olds (66%)

  ABs (65%) – but interest also high among C1s (60%)

Mintel Green and Ethical Consumers - UK - January 2007 Energy saving in the home

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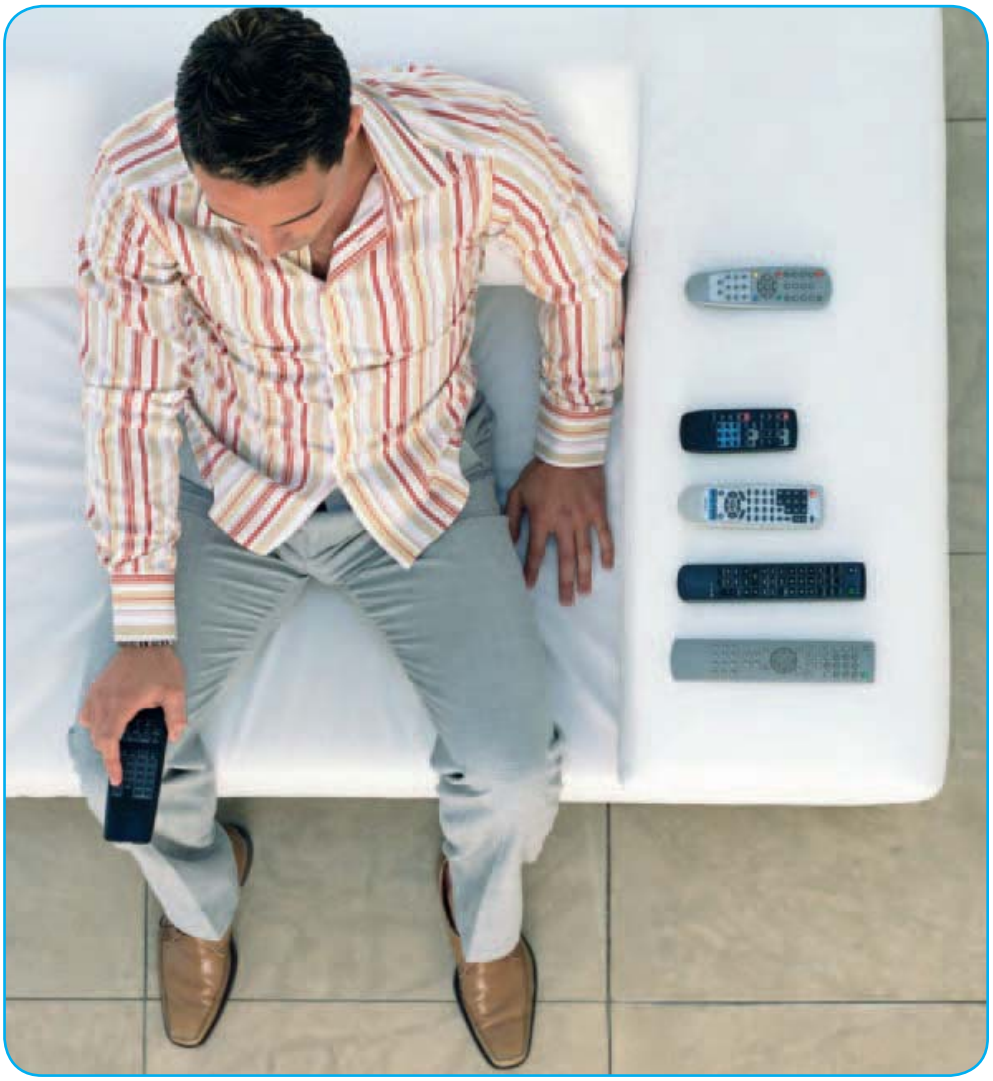
8.1.3 Marketing Strategy

Based on the supporting information the 'End Users' are those who are likely to seek out the latest technolgy, those for whom energy shortage is high on their list of ethical priorities ie 'keen to be green', and those prepared to make major energy saving changes their homes. But energy shortage would not the only driving factor - they would be driven also by the desire to save money.

This demographic is undoubtedly male, 35-44, 55-64, and both of these age groups are a high proportion of the more affluent AB's, having more disposable income. But further marketing opportunities are there for targeting women, as whilst woman are less enthusiastic of electronic equipment in general, aesthetics and style are higher up in their list of priorities, as are the ecological/green benefits.

Therefore to summarise; those who most need it, are also those who most want it, and most importantly those who can afford it!



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8.2 Branding & Logo

8.2.1 Name and Strapline

The name 'ALLSocket' was chosed as it is a play on the word wallsocket and all. The socket (track system) can accomodate all required plugs.

The strapline needed to be something which pitches to both the technical and emotional desires of the profiled end user.

The strapline 'UNCHAIN YOUR EQUIPMENT, CONSTRAIN YOUR CONSUMPTION' hopefully identifies very strongly with this demographic.

8.2.2 Logo Design

The logo is an important part of ALLSockets identity and the aim was to convey it's hidden benefit. The logo tried to convey it's 'green' ethics in the chosen colour, and it's technological funtion in the form of a small sinewave within a larger one.

Also there is a more subtle message in it's form - for if you look carefully you can see that it's also the letters 'A' and 'S' standing for of course ALLSocket Skirting.

ALLsocket skirting

Unchain your equipment,

Constrain your consumption

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9.0 Conclusions and Assessment

The ALLSocket concept is an ambition one, as it has it's work cut out aiming to replace a very ingrained, highly regulated and trusted system.

The Electrical system in the UK is the safest and most regulated in the world, and many experts would argue that it is overly safety conscious

Sceptics

There are many 'experts' who argue that standby waste is neglegible, despite the evidence. Their case is that there are other more wasteful practices that would be best tackled. But despite the standby issue, the ALLSocket would offer an alternative to anybody considering alternative power such as PV panels or - where appropriate - wind turbines. If many smaller household applicances can be run directly form the alternative source without rewiring your whole house, then ALLSocket concept would be the ideal solution.

9.1 Further Design Development:

There are many aspects of the design which are cause for concern and therefore require further development:

9.1.1 Rubber Lip:

On removing the ALLPlug, the contacts once fully released may drag the lip up, causing stress and weakness.

Also the angle at which teh rubber lip need to bend to allow the ALLPlug in could cause pinching and dragging *down,* which could possibly pull the lip out of it's keyway.

With this in mind it may be more suitable to revert back to the original thought of emplying bulb seals, and perhaps having one on each side of the opening. This way the seal need only move for half the distance, and becomes more 'squashed' that bent.

9.1.2 Cable Rotator and rewiring of the ALLPlug:

It is clear that the rotator part on the rear of the ALLPlug will need to be developed, so as to be able to re-wire applianced with it. It will most likely become a larger part, and therefore the rotating feature may have to be sacrificed.

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12.0 Appendix

A Technical Drawings

B Product Design Specification

C Prototyping Log Book

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Residential Power Distribution Track

Design Brief

The domestic system for power distribution has barely changed during the 100 years it's been employed, yet our use and dependency on electricity has changed immensely. Standard fixed-location power outlets pock-mark even the most modern designed interiors, and the problem with more dated buildings is that with our growing number of gadgets there are never enough outlets; so the need for extension gangs, more cables, and restrictions over location of our appliances.

By way of a track system integrated for example into the skirting board (or splash-back for kitchens), any number of appliances can be powered from any location, eliminating the existing 3-pin power outlet.

1.0 Performance

1.1 To supply power equivalent to more than 38 sockets per house (set by the National House Building Council's technical standards).

1.2 Supplied in various pre-cut lengths as existing skirting board, to be installed during renovation or new build.

1.3 Easy adaptable terminations for custom cut lengths and re-fitting in event of floor-plan changing.

1.4 Universally (backwards) compatible initially via adaptors.

1.5 All electrical products available with the dedicated plugs eventually.

1.6 Also capable of routing data/speaker cables, with their specific sockets as section inserts.

1.7 Prevents any other product (or fingers!) to enter the track and touch the live rail.

1.8 Carries a power saving feature i.e. auto cut-off for products which remain on standby for a specified time.

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1.9 Master switch to cut power to all non-essential items – possibly user-set with a switch on the adaptor.

1.10 Wide range of accessories especially those which save on consumption i.e. timers, limiters.

1.11 Possibility for direct DC power via variable switches to eliminate the need for a draw-load of transformers.

1.12 Reduced risk of shorting, perishing or overheating – the live and neutral terminals benefitting from much better separation than traditional cables.

1.13 Blank sections supplied to match the rails for walls that do not require electrical supply.

2.0 Environment

2.1 Indoor mostly domestic, temperature range -5 to 40 degrees centigrade.

2.2 Initially for European climate.

2.3 The Product may experience humid conditions especially in kitchens.

2.4 Robust, durable materials required due to dual role as skirting board therefore needs to withstand impact i.e. from vacuum cleaners.

2.5 Possibility of fluids spilled on floor.

3.0 Product Life Span

3.1 Product will be on the market for at least 20 years.

3.2 Will evolve with future technologies for power distribution.

4.0 Life in Service

4.1 Should withstand normal use for over 50 years.

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4.2 Life in service should be assessed against the criteria outlined in the Performance and Environment categories.

5.0 Shelf Life

5.1 The product will be stored on-site for up to 1 month before dispatched.

5.2 Distributors may store the product for several months.

6.0 Target Costs

6.1 Target RRP should not exceed £15 per metre – comparable to quality skirting board alone, (not including price of power sockets and cabling).

6.2 Blank sections will be comparably less.

6.2 The cost of manufacture should be less than £3 per metre.

6.3 The cost of packaging and shipping should be no more than 15% of the manufacturing cost.

7.0 Quantity

7.1 200 metres x 5000 homes = 1,000 000 metres first 5 years. (Less than 1% of new builds based on 160,000 new builds per year).

8.0 Maintenance

8.1 Track maintenance free

8.2 Adapters the only interaction, which may require user settings regarding no-essential item cut-off.

9.0 Marketing

9.1 Initially to be manufactured for the UK market then Europe, US, Canada, Australia, etc.

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9.2 Applicable markets:

New builds

Renovations

Housing associations

Regeneration projects

Interior designers

Eco Projects

The 'Grand Designs' culture

10.0 Packaging

10.1 Packaging / transport cost should be kept to a minimum and preferably below 5% of the unit cost.

10.2 Packs of multiples i.e. 10 x 2m, 5 x 1m, comparable to packs of laminate flooring.

11.0 Size and Weight Restrictions

A range of decorative mouldings may be developed differing in size.

11.1 Weight should not exceed 2 kg per metre. (Lighter than Eubiq system).

11.2 Length of longest unit not to exceed 4000mm.

11.3 Width not to exceed 25mm.

11.4 Height not to exceed 300mm.

12.0 Shipping

12.1 Product will be shipped by road within Europe.

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12.2 Product will be shipped by sea to US and Far Eastern markets.

13.0 Manufacturing Processes

13.1 Materials to be explored for casings are planed wood, injection-moulded polymers, extruded aluminium finished with powder-coating or soft-touch paint finish for rubbery feel.

13.2 Insulating material and plugs polycarbonate.

13.3 Assembly at factory.

14.0 Aesthetics

14.1 Form should belie function, and the piece will look architecturally designed. The existing Eubiq system is grey and anodized aluminium- very industrial looking.

15.0 Ergonomics

15.1 For domestic use the track will be at floor level, so consumer needs minimal time interacting with the track.

15.2 Tracks can be fitted at higher level ie for kitchen and workshops.

15.2 Adapters should be simple, with perhaps one switch/button/selection only to indicate if powered item is essential or not

15.3 One person install.

16.0 Customer Requirements

16.1 Little interaction as possible!

16.2 Range of finishes and mouldings.

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17.0 Competition

17.1 As yet only the Eubiq system.

HQ Singapore

Regional: Middle East & Australia

18.0 Quality and Reliability

18.1 Quality should be such that units should not generally fail within a period of 20 years.

19.0 Standards and Specifications

19.1 Standards/compliance:

- IEC standard 61534, which is the optimum standard used for distributing electricity in household, commercial and industrial premises
- EN 61534-1
- ASTA certification
- GOST.R certification
- PSB test mark

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20.0 Safety

20.1 Due to the separation and encapsulation of the live and neutral rails, the system should be safe from perishing or fluid spills.

20.2 Live rails should be inaccessible to any foreign objects (i.e. fingers).

21.0 Testing

21.1 Testing is to be carried out on 5% of units.

22.0 Legal

22.0 Should the unit comply with all standards, unaware of any litigation threats.

23.0 Installation

23.1 Installed during renovations/refits or new builds, buy tradesmen or proficient home DIY'ers.

24.0 Documentation

24.1 Product should be supplied with a user manual and tech-spec, covering installation.

24.2 Should be accompanied by brochure of accessories.

24.3 Also a feedback or request form for new accessories.

25.0 Disposal

25.1 Return to manufacturer redemption offer for any removed strips provided undamaged and operational.

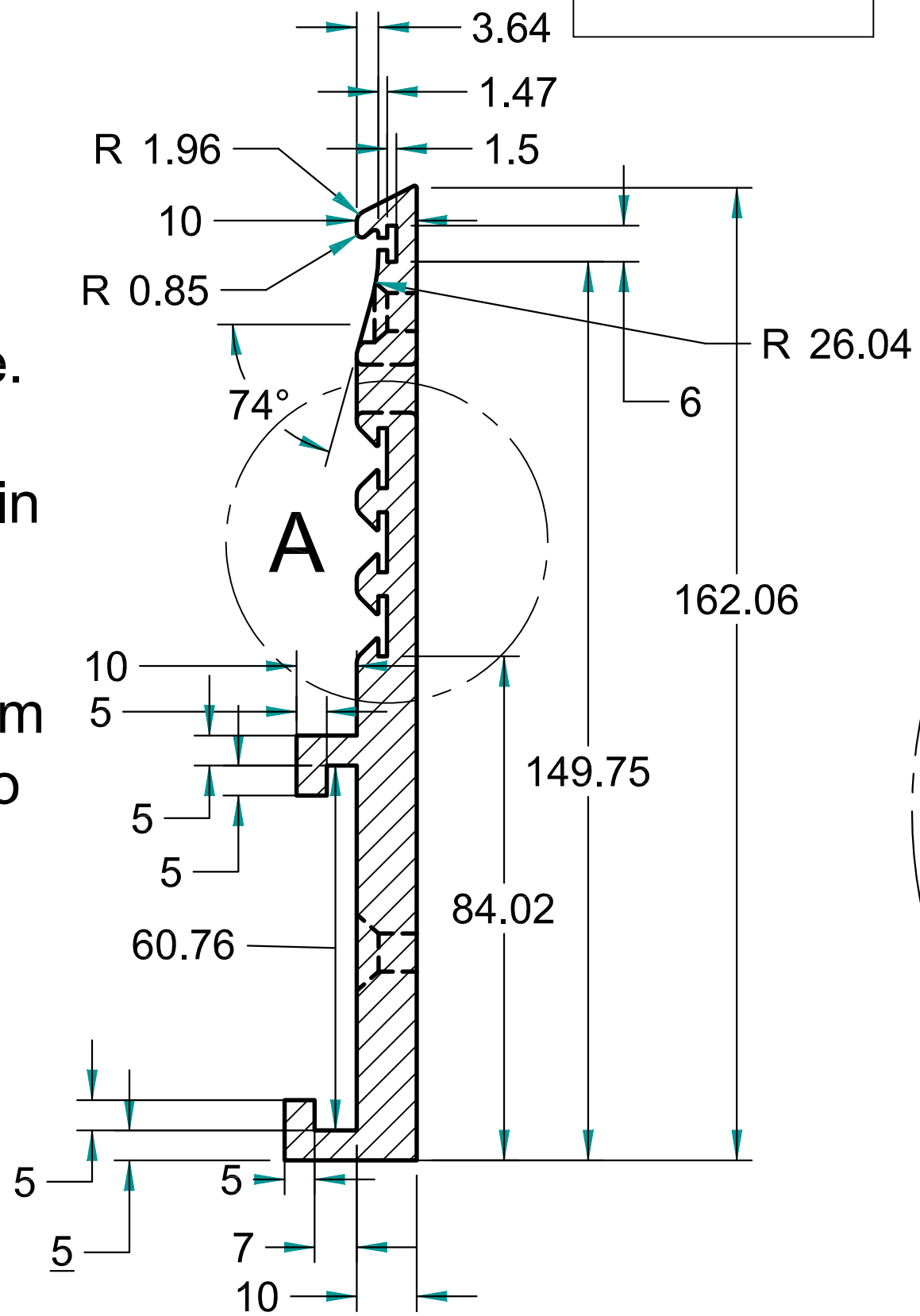
25.2 Recycling incentive for any damaged or non-working strips.

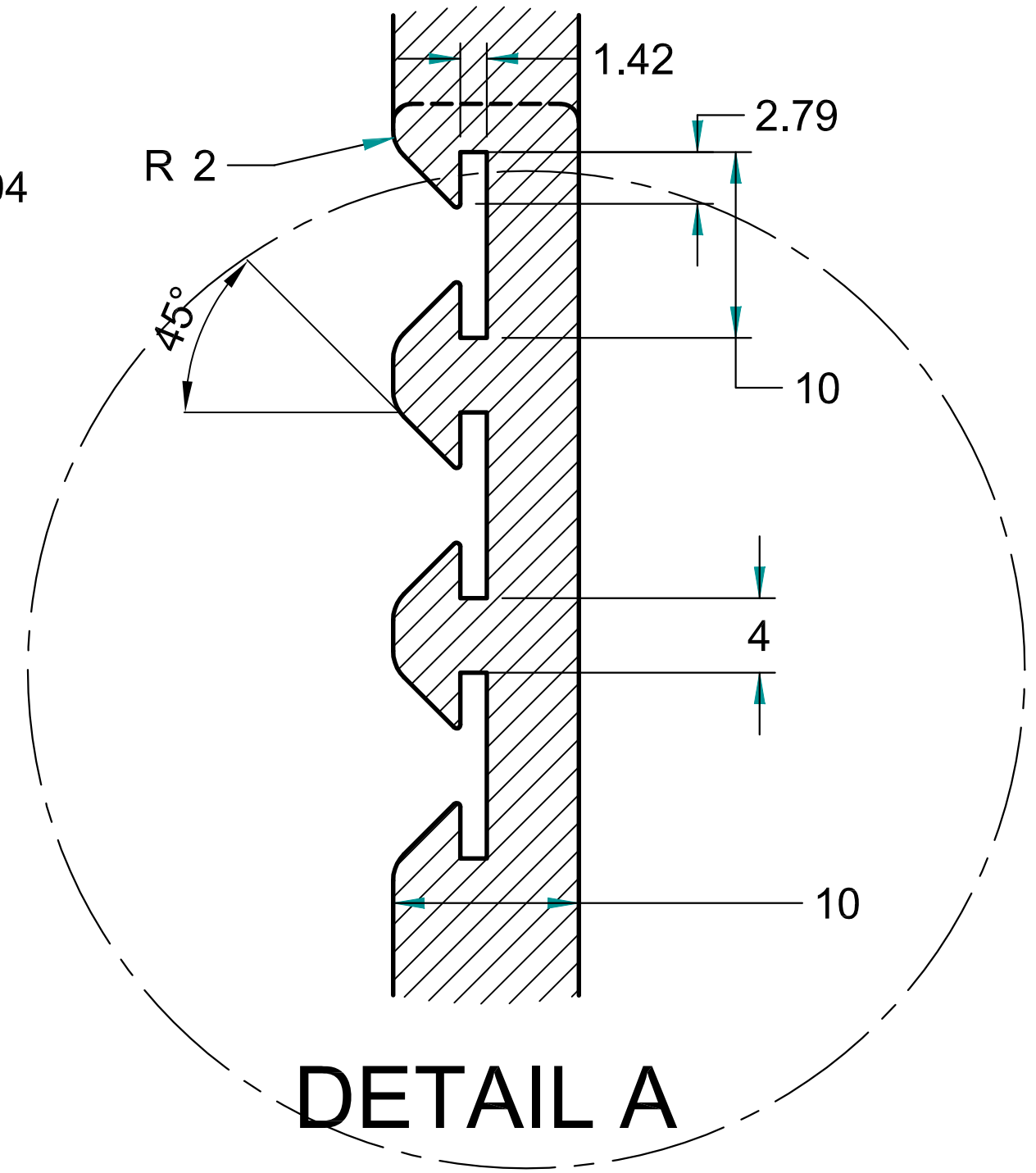
DRG NO. ASS 001

THIRD ANGLE PROJECTION

Extrusion Profile.

To be extruded in 4m lengths then cut in varying lengths in 500mm steps from 1m to 4m.





DETAIL A

ALL DIMENSIONS IN mm UNLESS OTHERWISE STATED	MATERIAL FINISH	uPVC Extrusion	TITLE ALLSocket Skirting : Back Panel	DRN	Ashley Kelly
					DATE 05/08
GENERAL TOLERANCE ± 0.25; ANGULAR ± 30'	LONDON SOUTH BANK UNIVERSITY			SCALE 1:1	DRG NO. ASS 001

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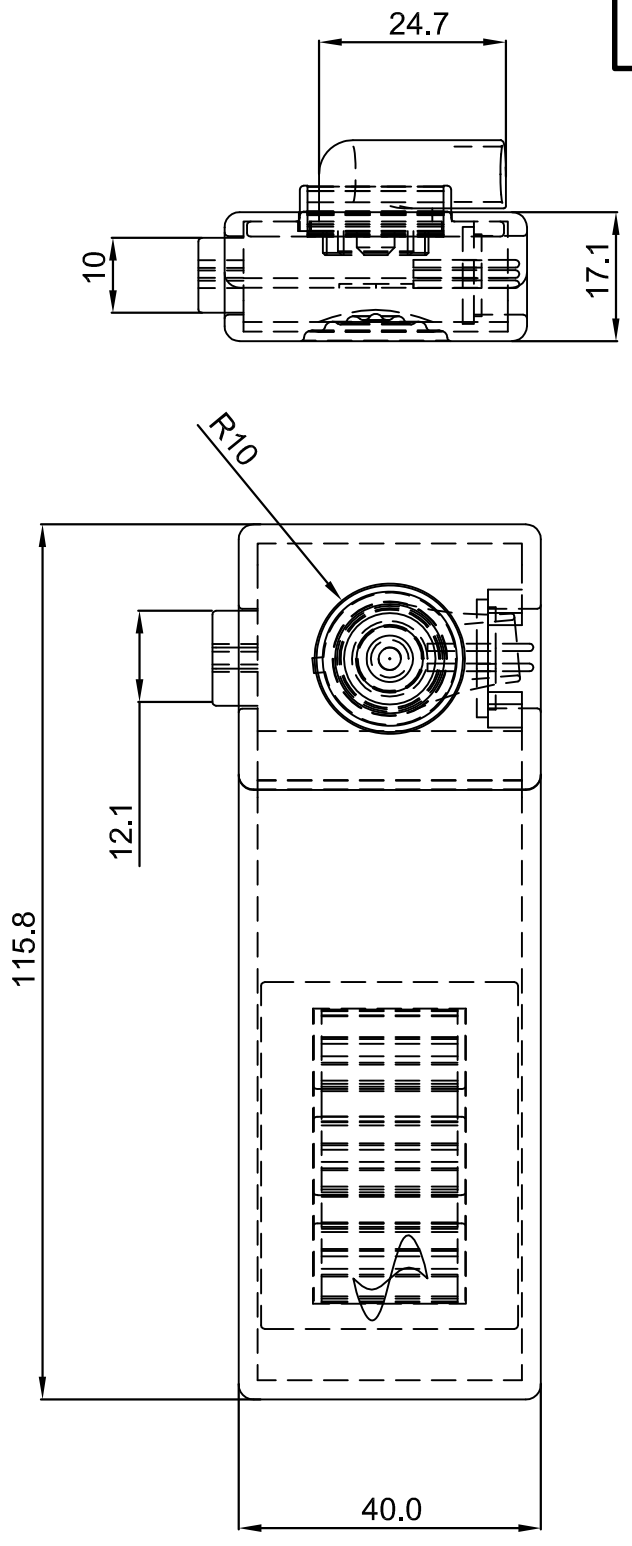
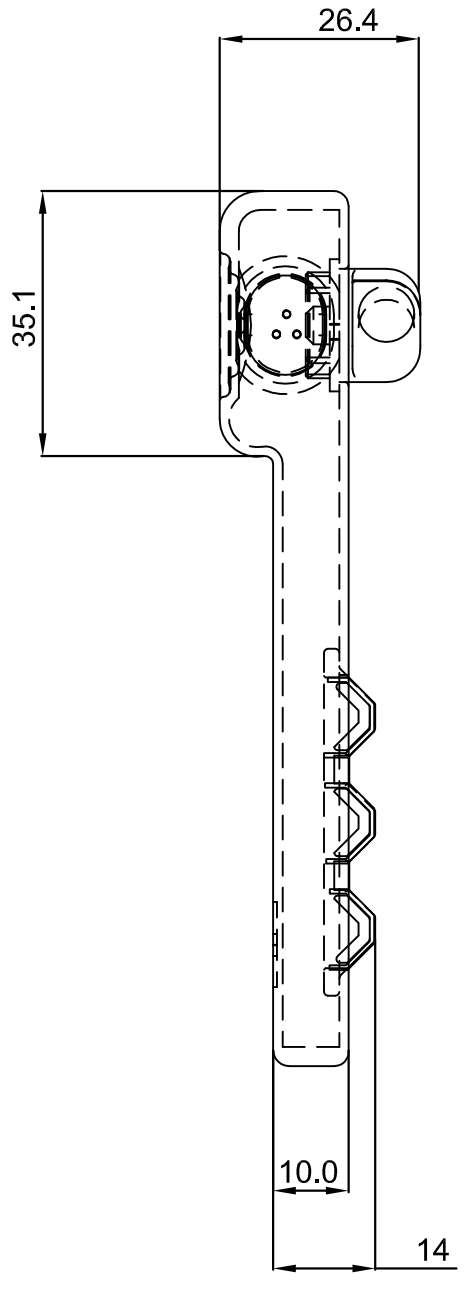
DRG NO.
ASS 004

THIRD ANGLE PROJECTION





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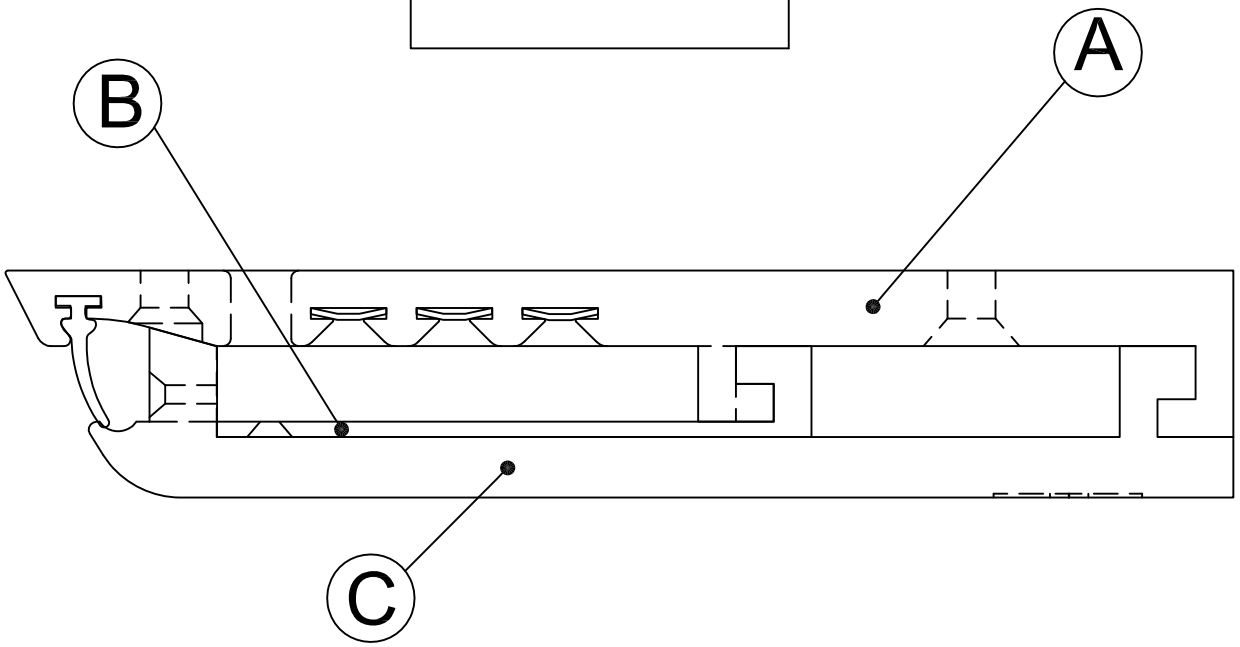
ALL DIMENSIONS IN mm UNLESS OTHERWISE STATED	MATERIAL Various Injection Moulded	TITLE ALLSocket Skirting : ALLPlug Assembly Major Dimensions	DRN	Ashley Kelly
				DATE 05/08
GENERAL TOLERANCE ± 0.25; ANGULAR ± 30'	LONDON SOUTH BANK UNIVERSITY		SCALE 1:1	DRG NO. ASS 004

DRG NO. ASS 000

THIRD ANGLE PROJECTION



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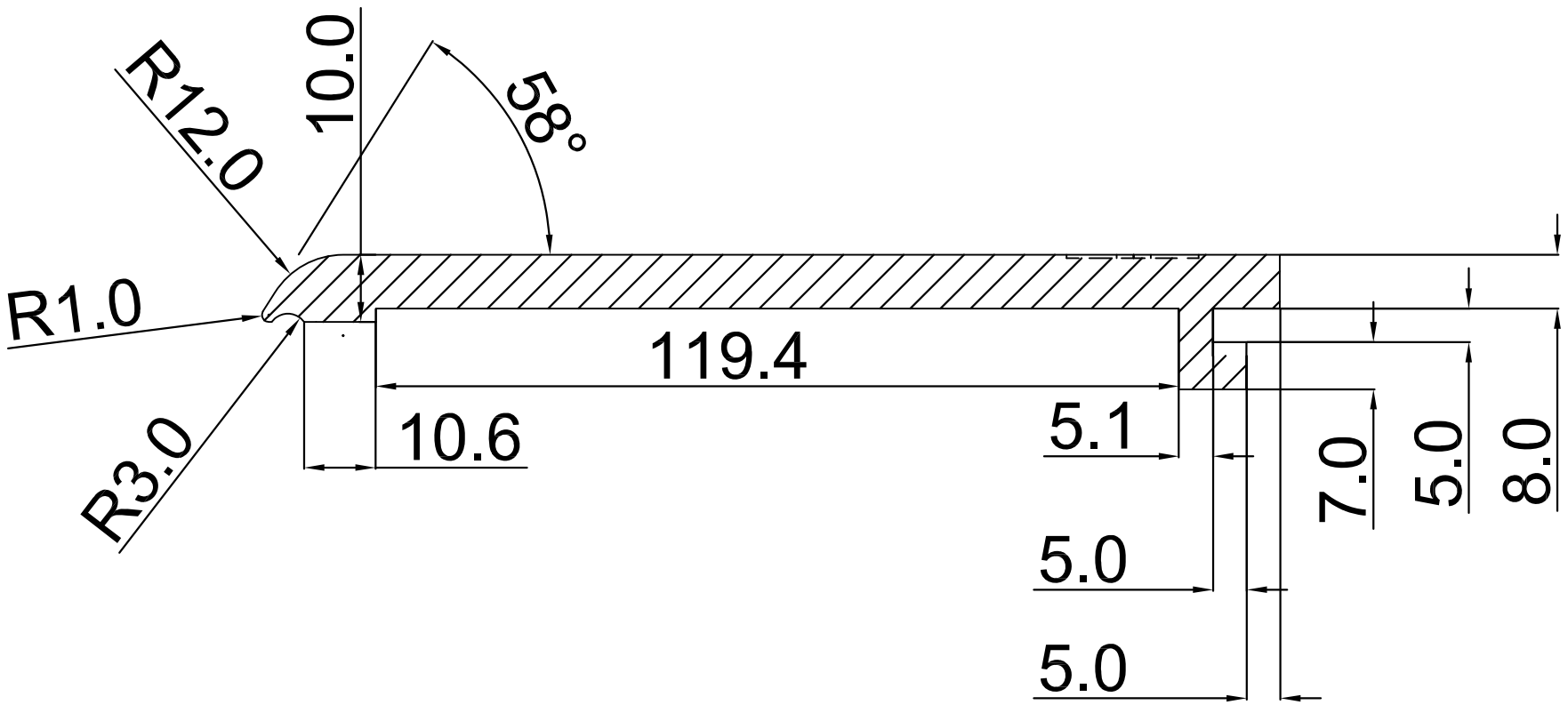
Extruded Components		
A	Back Panel	ASS001
B	Inner Cover	ASS002
C	Fascia	ASS003

ALL DIMENSIONS IN mm UNLESS OTHERWISE STATED	MATERIAL FINISH	TITLE ALLSocket Skirting : Skirt Assembly	DRN Ashley	Kelly
			2484561	DATE 05/08
GENERAL TOLERANCE ± 0.25; ANGULAR ± 30'	LONDON SOUTH BANK UNIVERSITY		SCALE 1:1	DRG NO. ASS 000

DRG NO.
ASS 003

THIRD ANGLE PROJECTION



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ALL DIMENSIONS IN mm UNLESS OTHERWISE STATED	MATERIAL uPVC Extrusion	TITLE ALLSocket Skirting : Fascia	DRN Ashley	Kelly
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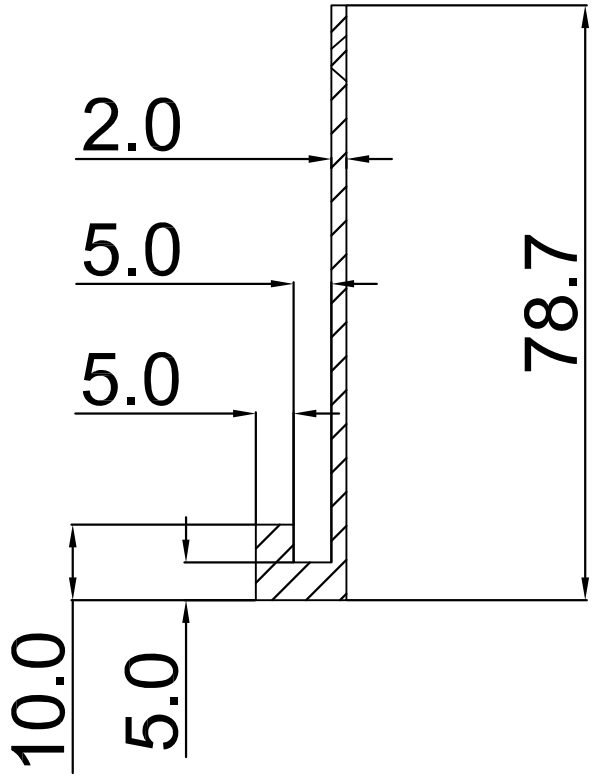
GENERAL TOLERANCE ± 0.25; ANGULAR ± 30'	LONDON SOUTH BANK UNIVERSITY		SCALE 1:1	DRG NO. ASS 003

DRG NO. ASS 002

THIRD ANGLE PROJECTION

Extrusion Profile.

To be extruded in 4m lengths then cut in varying lengths in 500mm steps from 1m to 4m.



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ALL DIMENSIONS IN mm UNLESS OTHERWISE STATED	MATERIAL uPVC Extrusion	TITLE ALLSocket Skirting : Inner Cover	DRN Ashley	Kelly
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